COVE RIVER BASIN

WEST HAVEN, CONNECTICUT

UPPER LAKE PHIPPS
DAM NO.1 - CT 00109
DAM NO.2 - CT 00110

PHASE I INSPECTION REPORT

NATIONAL DAM INSPECTION PROGRAM

DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION, CORPS OF ENGINEERS
WALTHAM, MASS. 02154

JULY 1980

UNCLASSIFIED

SECURITY CLASSIFICATION OF THIS PAGE *(When Data Entered)*

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West Haven, Conn.
Upper Lake Phipps

20. ABSTRACT *(Continue on reverse side if necessary and identify by block number)*

Upper Lake Phipps is impounded by Dam No.1, an earth embankment dam with stone masonry corewall, located at the eastern end of the Lake, and Dan No.2, a stone masonry concrete, and earth structure located near the southwest end of the Lake. A low causeway located on the north side of the Lake separates the Lake from a smaller pond.Dam No. has a top width of 10 ft., height of 29 ft., and length of 345 ft. Dam No. 2 consists of a maximum height of 14 ft., length of 190 ft.

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DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION, CORPS OF ENGINEERS
424 TRAPELO ROAD
WALTHAM, MASSACHUSETTS 02254

REPLY TO
ATTENTION OF:

NEDED

SEP 9 1980

Honorable Ella T. Grasso
Governor of the State of Connecticut
State Capitol
Hartford, Connecticut 06115

Dear Governor Grasso:

Inclosed is a copy of the Upper Lake Phipps Dam Nos. 1 & 2 Phase I Inspection Report, which was prepared under the National Program for Inspection of Non-Federal Dams. This report is presented for your use and is based upon a visual inspection, a review of the past performance and a brief hydrological study of the dam. A brief assessment is included at the beginning of the report. I have approved the report and support the findings and recommendations described in Section 7 and ask that you keep me informed of the actions taken to implement them. This follow-up action is a vitally important part of this program.

A copy of this report has been forwarded to the Department of Environmental Protection, the cooperating agency for the State of Connecticut. In addition, a copy of the report has also been furnished the owner, The Lake Phipps Land Owners Corp., West Haven, CT.

Copies of this report will be made available to the public, upon request, by this office under the Freedom of Information Act. In the case of this report the release date will be thirty days from the date of this letter.

I wish to take this opportunity to thank you and the Department of Environmental Protection for your cooperation in carrying out this program.

Sincerely,

MAX B. SCHEIDER
Colonel, Corps of Engineers
Division Engineer

Incl
As stated

UPPER LAKE PHIPPS
DAM NO. 1 - CT 00109
DAM NO. 2 - CT 00110

COVE RIVER BASIN
WEST HAVEN, CONNECTICUT

PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM

NATIONAL DAM INSPECTION PROGRAM
PHASE I INSPECTION REPORT

IDENTIFICATION NO: CT 00109 CT 00110

NAME OF DAM: Upper Lake Phipps Dam Nos. 1 and 2

TOWN: West Haven

COUNTY AND STATE: New Haven County, Connecticut

STREAM: Unnamed Tributary to Cove River

DATE OF INSPECTION: May 6, 1980

BRIEF ASSESSMENT

Upper Lake Phipps is impounded by Dam No. 1, an earth embankment dam with a stone masonry corewall, located at the eastern end of the Lake, and Dam No. 2, a stone masonry, concrete, and earth structure located near the southwest end of the Lake. A low causeway located on the north side of the Lake separates the Lake from a smaller pond.

Dam No. 1 has a top width of 10 feet, a maximum height of 29 feet, and a length of 345 feet. The dam consists of two sections separated by a bedrock knob located near the center of the dam. A stone masonry corewall with a top width of 2.5 feet extends the entire length of the dam. The outlet works located near the center of the right section of Dam No. 1 consists of the remains of an upstream intake structure, a stone masonry gate chamber adjacent to the corewall, and unknown piping.

Dam No. 2 consists of a stone masonry and concrete buttress wall with an upstream earth embankment. The dam has a maximum height of 14 feet and an overall length of 190 feet, including a 20 foot long

overflow spillway located at the right end of the dam. The spillway consists of a concrete cap on a stone masonry weir with 2.7 feet of freeboard from spillway crest to the top of Dam No. 2; Dam No. 1 is another 0.3 feet higher.

The dams impound Upper Lake Phipps, which is used for recreation and nonpotable water supply by the surrounding residents. The dams are owned by the Lake Phipps Landowners Corporation.

Based on the visual inspection, the dams are judged to be in poor condition. Features that could affect the future integrity of the dams are seepage downstream of Dam No. 1 and through the masonry wall of Dam No. 2; brush and trees present on the crests and slopes of both dams; continued erosion and slumping of the upstream slope of both dams; deterioration and movement of the masonry portions of Dam No. 2; and the unknown condition or existence of a low level outlet or blowoff line.

Dam Nos. 1 and 2 are classified as "Small" in size with a "High" hazard potential. A Test Flood equal to one-half the Probable Maximum Flood (1/2 PMF) was selected in accordance with the Corps of Engineers' Recommended Guidelines for Safety Inspection of Dams. The Test Flood inflow of 390 cfs results in a routed outflow of 240 cfs and a freeboard from water surface to the top of Dam No. 2 of 0.4 feet.

The spillway capacity, including the discharges through two 15-inch culverts at the causeway, is 310 cfs, or 130 percent of the Test Flood routed outflow.

It is recommended that a qualified, registered engineer be retained to investigate the seepage at both dams, to oversee tree

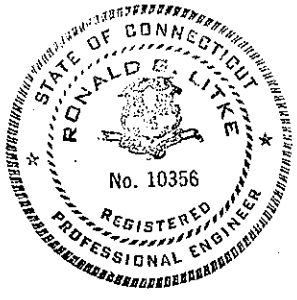
and stump removal at both dams, to investigate the significance of the depression on the upstream face of Dam No. 1, to design repairs to the upstream slopes of both dams, and to determine the location and condition of the low level outlet or blowoff line.

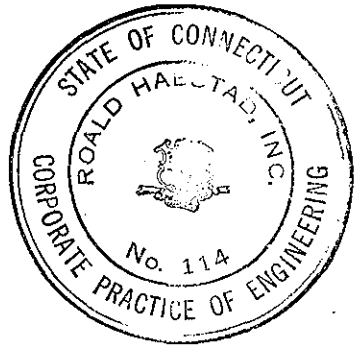
In addition, the dams should be inspected annually by a qualified, registered engineer, an operations and maintenance manual should be prepared, and a formal warning system put into effect.

The owner should implement the recommendations as described herein and in greater detail in Section 7 of the report within one year after receipt of this Phase I Inspection Report.

Ronald G. Litke
Project Engineer

Roald Haestad
President





This Phase I Inspection Report on Upper Lake Phepps has been reviewed by the undersigned Review Board members. In our opinion, the reported findings, conclusions, and recommendations are consistent with the Recommended Guidelines for Safety Inspection of Dams, and with good engineering judgment and practice, and is hereby submitted for approval.

ARAMAST MAHTESIAN, MEMBER
Geotechnical Engineering Branch
Engineering Division

CARNEY M. TERZIAN, MEMBER
Design Branch
Engineering Division

RICHARD DIBUONO, CHAIRMAN
Water Control Branch
Engineering Division

APPROVAL RECOMMENDED:

JOE B. FRYAR
Chief, Engineering Division

PREFACE

This report is prepared under guidance contained in the Recommended Guidelines for Safety Inspection of Dams, for Phase I Investigations. Copies of these guidelines may be obtained from the Office of Chief of Engineers, Washington, D.C. 20314. The purpose of a Phase I Investigation is to identify expeditiously those dams which may pose hazards to human life or property. The assessment of the general condition of the dam is based upon available data and visual inspections. Detailed investigation, and analyses involving topographic mapping, subsurface investigations, testing, and detailed computational evaluations are beyond the scope of a Phase I Investigation; however, the investigation is intended to identify any need for such studies.

In reviewing this report, it should be realized that the reported condition of the dam is based on observations of field conditions at the time of inspection along with data available to the inspection team. In cases where the reservoir was lowered or drained prior to inspection, such action, while improving the stability and safety of the dam, removes the normal load on the structure and may obscure certain conditions which might otherwise be detectable if inspected under the normal operating environment of the structure.

It is important to note that the condition of a dam depends on numerous and constantly changing internal and external conditions, and is evolutionary in nature. It would be incorrect to assume that the present condition of the dam will continue to represent the

condition of the dam at some point in the future. Only through continued care and inspection can there be any chance that unsafe conditions be detected.

Phase I Inspections are not intended to provide detailed hydrologic and hydraulic analyses. In accordance with the established Guidelines, the Spillway Test Flood is based on the estimated "Probable Maximum Flood" for the region (greatest reasonably possible storm runoff), or fractions thereof. Because of the magnitude and rarity of such a storm event, a finding that a spillway will not pass the test flood should not be interpreted as necessarily posing a highly inadequate condition. The test flood provides a measure of relative spillway capacity and serves as an aide in determining the need for more detailed hydrologic and hydraulic studies, considering the size of the dam, its general condition and the downstream damage potential.

The Phase I Investigation does not include an assessment of the need for fences, gates, no-trespassing signs, repairs to existing fences and railings and other items which may be needed to minimize trespass and provide greater security for the facility and safety of the public. An evaluation of the project for compliance with OSHA rules and regulations is also excluded.

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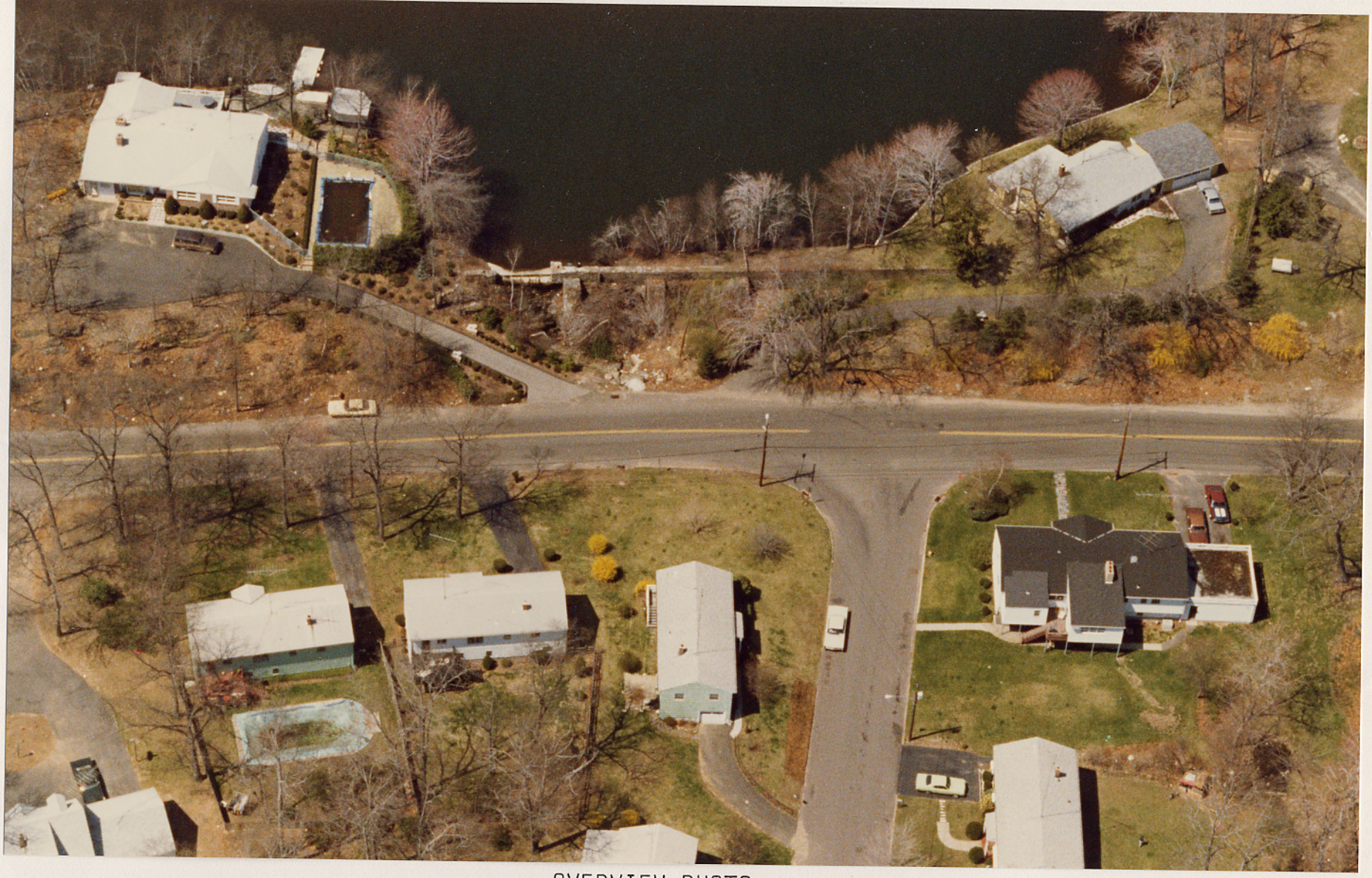
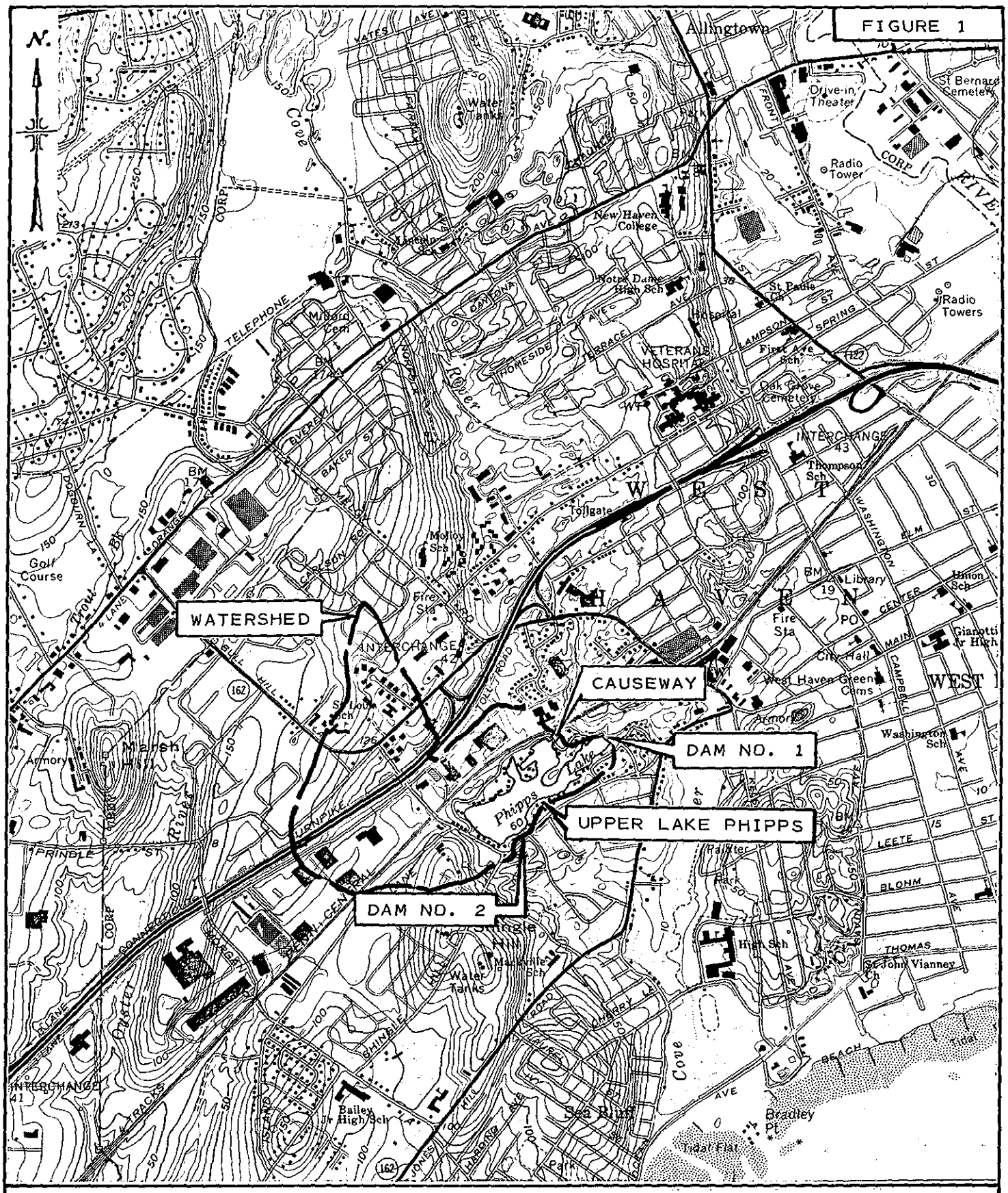
ROALD HAESTAD, INC. CONSULTING ENGINEERS WATERBURY, CONNECTICUT		TRIBUTARY TO COVE RIVER
		WEST HAVEN, CONNECTICUT DATE: 19 APRIL '80



OVERVIEW PHOTO

U.S.ARMY ENGINEER DIV. NEW ENGLAND CORPS OF ENGINEERS WALTHAM, MASSACHUSETTS	NATIONAL PROGRAM OF INSPECTION OF NON-FED. DAMS	UPPER LAKE PHIPPS DAM NO. 2 - CT 00110
ROALD HAESTAD, INC. CONSULTING ENGINEERS WATERBURY, CONNECTICUT		TRIBUTARY TO COVE RIVER
		WEST HAVEN, CONNECTICUT DATE: 19 APRIL '80

FIGURE 1



LOCATION PLAN

UPPER LAKE PHIPPS DAM NOS. 1 & 2
WEST HAVEN, CONNECTICUT

SCALE: 1" = 2000'

ROALD HAESTAD, INC. NEW HAVEN QUADRANGLE 1972

NATIONAL DAM INSPECTION PROGRAM
PHASE I INSPECTION REPORT

PROJECT INFORMATION
SECTION 1

1.1 General

a. Authority

Public Law 92-367, August 8, 1972, authorized the Secretary of the Army, through the Corps of Engineers, to initiate a National Program of Dam Inspection throughout the United States. The New England Division of the Corps of Engineers has been assigned the responsibility of supervising the inspection of dams within the New England Region. Roald Haestad, Inc., has been retained by the New England Division to inspect and report on selected dams in the State of Connecticut. Authorization and notice to proceed were issued to Roald Haestad, Inc., under a letter of April 14, 1980, from William E. Hodgson, Jr., Colonel, Corps of Engineers. Contract No. DACW33-80-C-0048 has been assigned by the Corps of Engineers for this work.

b. Purpose of Inspection

The purposes of the program are to:

1. Perform technical inspection and evaluation of non-federal dams to identify conditions requiring correction in a timely manner by non-federal interest.
2. Encourage and prepare the States to quickly initiate effective dam inspection programs for non-federal dams.
3. To update, verify and complete the National Inventory of Dams.

1.2 Description of Project

a. Location

Upper Lake Phipps is located on an unnamed tributary to the Cove River, approximately 1,500 feet southeast of the Connecticut Turnpike (I-95) in the City of West Haven, Connecticut. Dam No. 1 is located at the eastern end of the lake, while Dam No. 2 is located near the southwest end of the Lake, see location plan, page xiii. Dam No. 1 is shown on the New Haven Quadrangle Map having coordinates of latitude N 41° 06.1' and longitude W 72° 57.9'. Dam No. 2 has coordinates of latitude N 41° 15.9' and longitude W 72° 58.2'.

b. Description of Project

Upper Lake Phipps is impounded by Dam No. 1, an earth embankment with a stone masonry core wall, located at the eastern end of the Lake, and Dam No. 2, a stone masonry, concrete and earth structure located near the southwest end of the Lake. A causeway located on the north side of the Lake separates the Lake from a smaller pond. The causeway is owned by the City of West Haven and is not included in this report as it does not meet the Corps of Engineers' criteria for a Phase I Investigation.

Dam No. 1 consists of an earth embankment with a stone masonry corewall. The dam has a top width of 10 feet, a maximum height of 29 feet, an overall length of 345 feet, an upstream slope of 3 horizontal to 1 vertical, and a downstream slope of 2 horizontal to 1 vertical. The corewall has a top width of 2.5 feet and extends the entire length of the dam. The dam is covered with

tree and brush growth. There is no slope protection present on the upstream slope. The dam consists of two sections separated by a bedrock knob located near the center of the dam. The outlet works located near the center of the right section of the dam consist of the remains of an upstream intake structure, a stone masonry gate chamber adjacent to the corewall, and unknown piping. It was reported that portions of the outlet piping were removed and a downstream valve installed on the low level outlet or blow-off line during the installation of sanitary sewers downstream of the dam sometime prior to 1973.

A flooded manhole located downstream of the right section of the dam may be the location of the downstream valve, but it was not confirmed.

Dam No. 2 consists of a stone masonry and concrete buttress wall with an upstream earth embankment. The dam has a maximum height of 14 feet, an upstream slope of 2 horizontal to 1 vertical, and an overall length of 190 feet including a 20 foot long overflow spillway located at the right end of the dam. The dam has a top width of approximately 8 feet including the top of the masonry wall which is 3 feet wide. There are three stone masonry buttresses spaced 30 feet on centers beginning at the left end of the spillway and continuing toward the center of the dam. It appears that a concrete facing was placed against the wall between the stone masonry buttresses and that two additional concrete buttresses were added between the stone masonry buttresses. See Figure 2, page B-1 in Appendix B. The concrete facing varies in thickness from a minimum of 12 inches for the section adjacent

to the spillway to a maximum of 30 inches for the sections near the center of the dam. The spillway consists of a concrete cap over a stone masonry weir founded on ledge. There is approximately 2.7 feet from spillway crest to the top of Dam No. 2. Dam No. 1 is approximately 0.3 feet higher.

c. Size Classification - "Small"

According to the Corps of Engineers' Recommended Guidelines for Safety Inspection of Dams, a dam is classified as "Small" in size if the height is between 25 feet and 40 feet or the dam impounds between 25 Acre-Feet and 1,000 Acre-Feet. Dam No. 1 has a maximum height of 29 feet and Dam No. 2 has a maximum height of 14 feet. The maximum storage capacity is 320 Acre-Feet. Therefore, the dams are classified as "Small" in size.

d. Hazard Classification - "High"

Based on the Corps of Engineers' Recommended Guidelines for Safety Inspection of Dams, the hazard classifications for the dams are "High". A dam failure analysis indicated that a breach of either Dam No. 1 or Dam No. 2 would inundate several houses and overtop Connecticut Route 162, possibly resulting in the loss of more than a few lives.

Depths of flow over the State highway would be about 1 foot prior to dam failure and between 3 and 5 feet at the flood peak.

e. Ownership

The Lake Phipps Land Owners Corporation
William A. deLong, President
785 Main Street
West Haven, Connecticut 06156
(203) 933-0412

f. Operator

William A. deLong, Sr., President
Lake Phipps Land Owners Corporation
875 West Main Street
West Haven, Connecticut 06156
(203) 933-0412

g. Purpose of Dam

The dam impounds Upper Lake Phipps, which is used for recreation and nonpotable water supply by the residents surrounding the Lake.

h. Design and Construction History

There is no design or construction information available for the dams. The dams were reportedly constructed to impound water for public water supply.

i. Normal Operational Procedures

There are no formal operational procedures for the dams. The low level outlet or blowoff is normally opened once or twice a year.

1.3 Pertinent Data

a. Drainage Area

The drainage area consists of 0.37 square miles of highly developed "rolling" terrain.

b. Discharge at Damsite

The normal discharge at the damsite is through two 15-inch corrugated metal pipe culverts through the causeway. Water flows through these culverts to a small pond and then through another pair of 15-inch culverts in a small dike to a natural stream. A 20 foot overflow spillway at Dam No. 2 is approximately 0.5 feet higher than the invert of the culverts through the causeway.

1.	Outlet Works (conduits) Size:	Unknown
	Invert Elevation:	Unknown
	Discharge Capacity:	Unknown
2.	Maximum Known Flood at Damsite:	40 cfs, March 1980
3.	Ungated Spillway Capacity* at Top of Dam: (Dam No. 2)	310 cfs
	Elevation:	63.0
4.	Ungated Spillway Capacity* at Test Flood Elevation:	240 cfs
	Elevation:	62.6
5.	Gated Spillway Capacity at Normal Pool Elevation:	N/A
	Elevation:	
6.	Gated Spillway Capacity at Test Flood Elevation:	N/A
	Elevation:	
7.	Total Spillway Capacity* at Test Flood Elevation:	240 cfs
	Elevation:	62.6
8.	Total Project Discharge* at Top of Dam: (Dam No. 2)	310 cfs
	Elevation:	63.0
9.	Total Project Discharge* at Test Flood Elevation:	240 cfs
	Elevation:	62.6

*Spillway capacity includes two 15-inch ACCMP located at the causeway.

c. Elevation - Feet Above Mean Sea Level (NGVD)	Dam No. 1	Dam No. 2
1. Streambed at Toe of Dam:	34.3	49.2
2. Bottom of Cutoff:	Unknown	Unknown
3. Maximum Tailwater:	N/A	N/A
4. Recreation Pool:	59.8	59.8
5. Full Flood Control Pool:	N/A	N/A
6. Spillway Crest:	N/A	60.3
7. Design Surcharge - Original Design:	Unknown	Unknown
8. Top of Dam:	63.3	63.0
9. Test Flood Surcharge:	62.6	62.6

d. Reservoir - Length in Feet	
1. Normal Pool:	2,500 Feet
2. Flood Control Pool:	N/A
3. Spillway Crest Pool:	2,500 Feet
4. Top of Dam:	2,500 Feet
5. Test Flood Pool:	2,500 Feet

e. Storage - Acre-feet	
1. Normal Pool:	245 Acre-Feet
2. Flood Control Pool:	N/A
3. Spillway Crest Pool:	245 Acre-Feet
4. Top of Dam:	320 Acre-Feet
5. Test Flood Pool:	300 Acre-Feet

f. Reservoir Surface - Acres	
1. Normal Pool:	24.5 Acres
2. Flood-Control Pool:	N/A
3. Spillway Crest:	24.5 Acres
4. Test Flood Pool:	24.5 Acres
5. Top of Dam:	24.5 Acres

g. Dam	Dam No. 1	Dam No. 2
1. Type:	Earth Embankment with Stone Masonry Corewall	Concrete and Stone Masonry Buttress Wall with Upstream Earth Embankment
2. Length:	345'	190'
3. Height:	29'	14'
4. Top Width:	10'	8'
5. Side Slopes:	D.S. 2 horiz. to 1 ver. U.S. 3 horiz. to 1 ver.	D.S. near ver. U.S. 2 horiz. to 1 ver.
6. Zoning:	Unknown	N/A
7. Impervious Core:	Stone Masonry Wall 2'-6" Wide at Top	N/A
8. Cutoff:	Unknown	Unknown
9. Grout Curtain:	N/A	N/A
10. Other:	N/A	N/A

h. Diversion and Regulating Tunnel N/A

i. Spillway

1. Type:	Overflow Stone Masonry Weir with Concrete Cap
2. Length of Weir:	20 Feet
3. Crest Elevation with Flash Boards: without Flash Boards:	 N/A 60.3
4. Gates:	N/A
5. Upstream Channel:	N/A
6. Downstream Channel:	Channel in ledge which leads to 36-inch and 24-inch culverts under roadway
7. General:	Spillway located at Dam No. 2.

j. Regulating Outlets (Unknown)

1. Invert:

2. Size:

3. Description:

4. Control Mechanism:

5. Other:

ENGINEERING DATA
SECTION 2

2.1 Design Data

There was no design data available on the construction of either Dam No. 1 or Dam No. 2. A plan entitled "Upper Lake Phipps, Plans of Repairs and Alterations to Dams # 1 & 2 and Map of Dam #3" prepared by Clarence Blair Associates and dated June 15, 1972 was available and reviewed. The dike at the pond downstream of the causeway is referred to as Dam No. 3 by the State of Connecticut.

2.2 Construction Data

There was no information available on the construction of either dam. It was reported that the dams were originally constructed to impound a water supply reservoir, but that the owners ran out of money before any water was ever sold. Correspondence indicates that a sewer line was constructed near the toe of Dam No. 1 prior to 1973. It was reported that during the construction of the sewers, piping downstream of the dam was removed and a valve installed on the low level outlet or blowoff line. Repairs to the spillway weir were made in the fall of 1979 by members of the Lake Phipps Land Owners Association. It was reported that a reinforced concrete cap was installed over the existing stone masonry weir. Reinforcing dowels were supposedly grouted into the existing stone masonry to anchor the concrete cap to the existing structure.

2.3 Operation Data

There is no known operation data available on the dam. The State of Connecticut, Department of Environmental Protection has performed numerous inspections on the dams. Inspection reports

and various correspondence concerning required repairs were available and reviewed. See Appendix B.

2.4 Evaluation of Data

a. Availability

Existing data was provided by the State of Connecticut, Department of Environmental Protection, and Clarence Blair Associates.

b. Adequacy

As no design or construction data was available, the assessment of the dam was based on the visual inspection, past performance history, and hydraulic and hydrologic calculations performed for this report.

c. Validity

The condition of the dams appears to be as indicated in the State of Connecticut, D.E.P. Inspection Reports. The repairs and alterations shown on the Clarence Blair Associates Plan do not appear to have been made.

VISUAL INSPECTION

SECTION 3

3.1 Findings

a. General

The Upper Lake Phipps Dams were inspected on May 6, 1980. At the time of inspection the water level was approximately 0.5 feet below spillway level. The general condition of the dams at the time of inspection was poor.

Upper Lake Phipps is impounded by two dams. Dam No. 1 consists of an earth embankment with what appears to be a stone masonry corewall and is located at the east end of the Lake. Dam No. 2 consists of a stone masonry, concrete and earth structure located on the south side of the Lake.

b. Dam

Dam No. 1

Dam No. 1 appears to consist of two sections. The right section is about 175 feet long and extends from the right abutment to a bedrock knob, Photo 1. The left section is also about 175 feet long and extends from the bedrock knob near the center of the dam to the left abutment, Photo 2.

The upstream face of the dam is covered with large trees and brush, Photos 1 and 2. There was no evidence of riprap slope protection on the upstream slope. Erosion has occurred at most locations along the waterline. A depression approximately 20 feet long and up to 2.5 feet deep was present upstream of the stone masonry gate chamber, Photo 1. It appears that stones had been placed in this area possibly to reduce erosion of the slope.

The crest of the dam is somewhat irregular with a path worn bare by pedestrian traffic. There is what appears to be a stone masonry corewall, approximately 2.5 feet wide at the top, across the entire length of the dam. The top of the wall is at ground level, Photo 2, with the exception of a 30 foot long section near the downstream stone masonry gate chamber where approximately 2.5 feet of the wall is exposed, Photo 1.

Brush, shrubs and small and large trees are growing on the downstream slope of the dam. A small stone wall approximately 40 feet long and 2.5 feet high exists at about the toe of the downstream slope near the left abutment, Photo 3. Seepage was observed discharging at the base of a 3-inch diameter sapling, Photo 4, approximately 10 feet downslope from the small stone wall. The flow was relatively clear with a slight presence of rust-colored floccules. Water was also observed discharging near the toe of the slope in the area of an adjacent sanitary sewer.

There is a large wet area with no discharging water at the downstream toe of the right section of the dam, Photo 5. The standing water contains a large quantity of rust-colored floccules. The remainder of the area is damp and contains mositure loving vegetation. A manhole was present approximately 50 feet downstream of the toe of the dam. The water level within the manhole was about 6 inches below ground surface. The manhole did not appear to be connected to the adjacent sanitary sewer and may be the location of a downstream gate on the low level outlet or blowoff line. A small flow of seepage with an oily sheen and rust-colored floccules was observed downstream from the manhole, Photo 6.

Dam No. 2

Dam No. 2 consists of a stone masonry and concrete wall with an upstream earth embankment, Photo 7. An overflow spillway is present at the right end of Dam No. 2.

The upstream earth embankment is covered with numerous trees and brush, Photo 8. Erosion and slumping has occurred at many locations along the upstream face. At the left end of the dam there is a stone masonry retaining wall on the upstream face which continues along the edge of the Lake past the left abutment.

A path has been worn along the entire length of the crest. Trees and brush are growing on the crest, Photo 8.

The stone masonry and concrete wall appears to have been originally constructed as a stone masonry buttress wall with three stone buttresses. A concrete wall and two concrete buttresses appear to have been added against the stone masonry wall at a later date. The concrete sections are badly deteriorated. The area downstream of the wall is heavily overgrown with brush and appears to be a disposal area for branches and cut brush. Due to the brush and branches it was possible to inspect only the upper 5 feet of the wall. However, seepage was observed through the base of the wall. Several tree stumps up to 6-inches in diameter were observed protruding from the wall. A portion of the wall adjacent to the spillway appears to have been displaced approximately 6 inches laterally, Photo 9.

A 5 foot long masonry wall to the right of the spillway and adjacent to the right abutment appears to be leaning downstream and 3 to 6 inches out of plumb. Stumps up to 5 inches in diameter were observed both upstream and downstream of the wall.

c. Appurtenant Structures

The appurtenant structures consist of the outlet works located at Dam No. 1, the overflow spillway located at Dam No. 2, and the culverts located at the causeway.

The outlet works are located at the right section of Dam No. 1. The remains of an intake structure are located upstream of the dam, Photo 11. A downstream stone masonry gate chamber, Photo 1, is covered by a concrete slab and steel plate. It is reported that there is a downstream gate on the low level outlet or blowoff line that is operated at least once a year. Other than the manhole noted under section 3.1.b., no evidence of a downstream gate or outlet was observed.

The spillway has been recently repaired by placing a concrete cap over the existing stone masonry weir, Photo 7. As was previously noted, the stone masonry walls on either side of the spillway channel have been displaced and are out of plumb. Seepage was observed through the stone masonry portion of the spillway along its entire length. The spillway is founded on ledge and the discharge channel is in ledge.

At the causeway two 15-inch corrugated metal pipe culverts, Photo 12, discharge into a small pond which discharges to a natural stream through two additional 15-inch culverts.

d. Reservoir Area

The slopes of the reservoir appear to be stable. Sedimentation behind the dams was not observable.

e. Downstream Channel

The spillway discharge channel is in ledge and is cluttered with fallen limbs, brush and debris. Both sides of the channel are

lined with small trees and brush. The discharge channel flows into 30-inch and 24-inch culverts downstream of the dam, Photo 10. There is a grate over the entrance to the 30 inch culvert which is susceptable to clogging.

3.2 Evaluation

On the basis of the visual inspection Upper Lake Phipps Dam Nos. 1 and 2 are considered to be in poor condition.

Seepage is occurring at the toe of the left section of Dam No. 1. Also, there is discharge of water downstream of the toe of the left section of Dam No. 1, possibly due to seepage through the foundation. Seepage could lead to internal erosion and breaching of the dam if not controlled.

There is a large wet area (with no discharge of flowing water) at the toe of the right section of Dam No. 1. This wet area may be indicative of seepage problems which could eventually cause instability of the dam, if not corrected.

Brush and small trees growing on the upstream and downstream slopes of Dam No. 1 and Dam No. 2 make it difficult to inspect these areas adequately. Also, if trees are allowed to grow to a large size internal erosion along the root systems may develop or the dams may be damaged by uprooting of the trees during a storm.

Erosion and slumping are occurring on the upstream slopes of both dams at the waterline and could eventually result in breaching of the dam if not controlled. There is a low area on Dam No. 1 in front of the stone masonry gate chamber. Continued subsidence in this area could lead to breaching of the dam if not controlled.

Continued deterioration and movement of the stone masonry and concrete portions of Dam No. 2 and seepage through the wall may lead to instability of the dam.

4.1 Operational Procedures

a. General

There are no operational procedures in effect for the dams.

b. Description of Any Warning System in Effect

There is no formal warning system in effect. The dam is monitored during heavy rains by residents living in the vicinity of the dams.

4.2 Maintenance Procedures

a. General

There are no formal maintenance procedures in effect for the dams. Minor repairs are made by members of the Land Owners Corporation.

b. Operating Facilities

It is reported that the low level outlet or blowoff gate is normally opened once or twice a year by City forces to assure its operation. The gate or outlet for the low level outlet or blowoff line was not located during field surveys or inspection.

4.3 Evaluation

Present operations and maintenance procedures are inadequate as is evident from the general condition of the dams and the failure of the owner to comply with the State of Connecticut recommendations for repairs.

An operations and maintenance manual for the dams should be prepared. The dams should also be inspected annually by a qualified, registered engineer. A formal warning system should be

put into effect and should include monitoring of the dams during extremely heavy rains and procedures for notifying downstream authorities in the event of an emergency.

5.1 General

The spillway for Upper Lake Phipps is located at the right abutment of Dam No. 2, a stone masonry, concrete and earth dam on the south side of the lake. The spillway is 20 feet long and there is a distance of 2.7 feet from spillway crest to the top of Dam No. 2. Dam No. 1 is about 0.3 feet higher than Dam No. 2. The spillway consists of a concrete cap on a stone masonry wall with the remains of stone masonry training walls on each side. The downstream channel is in ledge. The spillway has a capacity of about 295 cfs before overtopping Dam No. 2.

Additional discharge capacity is provided by two 15 inch corrugated metal pipes at a small causeway located on the north side of the lake. Water flows through these pipes to a small pond and then through another pair of 15-inch corrugated metal pipes in a small dike to a natural stream. The inverts of the culverts at the causeway are 0.5 feet below the spillway crest, and the culverts at the small dike are another 0.3 feet lower. The culverts are used for the normal discharge from the lake with the spillway discharging storm flows. The total capacity of the culverts is about 15 cfs.

There is also reported to be a low level outlet or blowoff at Dam No. 1. A flooded manhole downstream of the toe of the dam may contain the blowoff valve, but it was not confirmed. An upstream intake chamber reportedly contains an inoperative valve but no valve was observed.

The watershed for Upper Lake Phipps is in a highly developed section of West Haven. The 0.37 square miles of rolling terrain includes a portion of Interstate 95, the Amtrack main line (4 tracks), several large commercial and industrial complexes, and both single and multiple family dwellings. Runoff from the area north of the railroad can only reach the lake through several restrictive culverts. These culverts act to reduce peak inflows to the lake.

Elevations range from 190 at the northern part of the watershed to 60 at the spillway.

5.2 Design Data

No design data was available, but a letter report on the hydrologic capacity of the spillway by Buck and Buck, Engineers, dated January 15, 1980 was reviewed and is included in Appendix B. The conclusion of the report is that the spillway has sufficient hydraulic capacity for the 100-Year Flood and may be able to pass the 1/2 PMF.

5.3 Experience Data

A nearby resident indicated that the maximum flow he had seen occurred in March 1980 when the depth of flow over the spillway was approximately 8 inches. This represents a project discharge of approximately 40 cfs.

5.4 Test Flood Analysis

The Upper Lake Phipps Dams are classified as "Small" in size with a "High" hazard potential. According to the Corps of Engineers' Recommended Guidelines for Safety Inspection of Dams, the Test Flood for a "Small", "High" hazard dam should be in the range of one-half the Probable Maximum Flood (1/2 PMF) to the Probable Maximum Flood (PMF) depending on the involved risk.

A Test Flood equal to 1/2 PMF was selected as both the height of the dams and storage capacity of Upper Lake Phipps are on the lower range for a "Small" dam.

A 1/2 PMF inflow flood peak of about 390 cfs was calculated for the 0.37 square mile drainage area using a peak flow rate of 2125 cubic feet per second per square mile (csm) from the guide curve for "rolling" terrain supplied by the Corps of Engineers for the PMF. The Test Flood was routed through the impoundment using "Estimating Effect of Surcharge Storage on Maximum Probable Discharges" provided by the Corps of Engineers. The Test Flood routed outflow was calculated to be 240 cfs. The spillway was found to have a discharge capacity equal to about 130 percent of the Test Flood routed outflow, including the two 15 inch culverts at the causeway, or 123 percent without the culverts.

5.5 Dam Failure Analysis

A dam failure analysis was made using the "Rule of Thumb" guidance provided by the Corps of Engineers. Separate failures were calculated for Dam No. 1 and Dam No. 2. Failures for Dam No. 1 and Dam No. 2 were assumed when water reached the top of the dams.

The dam breach for Dam No. 1 would release up to 10,500 cfs into Lower Lake Phipps directly below the dam. The flood waters would exit Lower Lake Phipps in two places; at the small brook on the south side of the Lake (Section 1A), and over the dam at the east end of the Lake (Section 1B), see Figure 5 in Appendix D. Flows at Section 1A are estimated at 1260 cfs and would flow down the stream without affecting any homes. The flood waters would overtop Main Street (Route 162), Section 2A, by about 2 feet and

would dissipate in the tidal marsh without causing serious damage.

The flow over the spillway section of Lower Lake Phipps, Section 1B, was estimated to be 7760 cfs. The flood waters would flow through a schoolyard and inundate 3 commercial buildings and one home before overtopping Main Street (Route 162) by 3 - 4 feet. South of Main Street 15 - 20 more homes and 2 apartment buildings would be affected before the flood waters reached the tidal marsh. The topography of the area at Main Street does not provide well defined channels for flood routing, so that the extent of flooding downstream was estimated from a visual inspection of the area.

Failure of Dam No. 2 would release about 4600 cfs onto and across Main Street, Section 1C. The existing culverts under Main Street are a 24-inch and a 36-inch pipe. The 80 cfs capacity of these pipes is insignificant compared to the dam breach flood. The flood waters would overtop Main Street by about 4-1/2 feet and would flood several houses to an undetermined depth before returning to the stream channel. Depth of flow prior to dam breach would be about 1-1/2 feet over the road, based on the maximum spillway capacity of 295 cfs.

Downstream at Route 162, Section 2C, the flood peak would be about 3900 cfs and would overtop the highway by about 5-1/2 feet. The two 30-inch culverts at this section have a capacity of about 90 cfs. The flood waters would inundate 2 houses on Route 162 to about 1 foot above the sills. Depth of flow at Section 2C prior to dam breach would be about 1 foot over the road based on the maximum spillway capacity of 295 cfs.

From Route 162 the flood waters would discharge to the tidal marsh without further damage.

The dams were classified as "High" potential hazard because of the possible loss of more than a few lives and downstream property damage should they fail.

6.1 Visual Observation

The visual observations indicate the following potential problems:

1. Seepage at the downstream toe of Dam No. 1 could lead to internal erosion if not controlled.

2. Erosion of the upstream slope of Dam No. 1 at and above the waterline could eventually result in breaching of the dam if allowed to continue.

3. The possible development of internal erosion along the root systems of trees growing on the upstream slope, crest and downstream slope of Dam No. 1 and the upstream slope of Dam No. 2, or possible damage to the embankments due to uprooting of these trees during a storm.

4. The deteriorated condition of the stone masonry walls adjacent to the spillway channel may lead to the eventual collapse of the walls. A collapse of the walls would probably affect the stability of Dam No. 2.

5. Continued deterioration of the concrete portion of the masonry wall and buttresses could affect the stability of Dam No. 2.

6.2 Design Data

There was no design or construction data available for review.

6.3 Post-Construction Changes

Correspondance indicates that a sanitary sewer was constructed near the toe of Dam No. 1 some time prior to 1973. It was reported that during the construction of the sewer portions of the outlet

pipes from the dam were removed and a valve installed on one of the outlet lines. As-Built Plans of the sanitary sewer do not indicate any such work.

Culverts were installed through Dam No. 3 at an unknown date in order to reduce the flow through the 24 and 30 inch culverts downstream from the overflow spillway.

The spillway level was raised approximately 5 inches when the concrete cap was constructed in 1979.

6.4 Seismic Stability

The dams are located in Seismic Zone I and, in accordance with the recommended Phase I Guidelines, do not warrant seismic stability analysis.

7.1 Dam Assessment

a. Condition

On the basis of the visual inspection, Upper Lake Phipps Dam Nos. 1 and 2 are judged to be in poor condition. The future integrity of the dams could be affected by the following conditions:

1. Seepage downstream of Dam No. 1 and through the masonry wall of Dam No. 2.

2. Brush and trees growing on the upstream slope, crest and downstream slope of Dam No. 1, and the upstream slope of Dam No. 2.

3. Movement of stone masonry walls adjacent to the spillway channel.

4. Erosion and slumping of the upstream slope at and above the waterline on both dams.

5. Deterioration of the concrete portion of the masonry wall and buttresses of Dam No. 2.

6. The unknown condition or existence of a low level outlet or blowoff line.

An evaluation of the hydraulic and hydrologic features of the dams determined that the spillway is capable of passing 130 percent of the Test Flood routed outflow (1/2 PMF).

b. Adequacy of Information

The information available was sufficient for performing a Phase I Inspection.

c. Urgency

The recommendations presented in Section 7.2 and 7.3 should

be carried out by the owner within one year of receipt of this Report.

7.2 Recommendations

The following recommendations should be carried out under the direction of a qualified, registered engineer:

1. Investigate the seepage downstream of Dam No. 1 and through the masonry wall of Dam No. 2. Establish a seepage monitoring program and design control measures as required.

2. Oversee the removal of trees, stumps and root systems from Dam Nos. 1 and 2, and from the area 25 feet wide downstream of the dams.

3. Investigate the significance of the depression on the upstream face of Dam No. 1 near the stone masonry gate chamber and design necessary repairs.

4. Design repairs for the erosion and slumping that has occurred at and above the waterline of both dams.

5. Determine the location and condition of the low level outlet or blowoff and evaluate its condition and adequacy. If only a downstream valve is present, modifications should be designed to allow for a shutoff valve upstream of the dam.

6. The downstream face of the masonry wall of Dam No. 2 and the area adjacent to the wall should be inspected following the removal of brush and debris.

7. The stability of the spillway training walls should be investigated and repairs designed and constructed.

The owner should implement all recommendations of the engineer based on the findings of the above investigations.

7.3 Remedial Measures

a. Operating and Maintenance Procedures

1. A program of annual technical inspections by qualified, registered engineers should be instituted.

2. Brush should be cleared from the crest and slopes of the dams. The embankments should be maintained free of brush, and have adequate ground cover to protect the slopes from erosion.

3. An operations and maintenance manual for the dams should be prepared.

4. A formal warning system should be put into effect and include monitoring of the dam during extremely heavy rains and procedures for notifying downstream authorities in the event of an emergency.

7.4 Alternatives

There are no practical alternatives to the above recommendations.

APPENDIX A

VISUAL CHECK LIST WITH COMMENTS

VISUAL INSPECTION CHECK LIST
PARTY ORGANIZATION

PROJECT: Upper Lake Phipps Dam Nos. 1 and 2

DATE: 5/6/80 TIME: 2:00 to 5:00pm WEATHER: Sunny

W.S. ELEVATION: 59.8 U.S. N/A DN.S
6" below spillway

	PARTY	DISCIPLINE
1.	Ronald G. Litke, P.E. - Roald Haestad, Inc.	Civil Engineer
2.	Donald L. Smith, P.E. - Roald Haestad, Inc.	Civil/Hydrologist
3.	Richard Murdock, P.E. - Geotechnical Engineers, Inc.	Geotechnical Engineer
4.		
5.		
6.		

	PROJECT FEATURE	INSPECTED BY	REMARKS
1.	Dam Embankment (Dam No. 1)	RGL,DLS,RM	Extensive vegetation Some seepage
2.	Dam Embankment (Dam No. 2)	RGL,DLS,RM	Extensive vegetation Some seepage
3.	Outlet Works - Intake Channel and Structure	RGL,DLS	Remains of upstream intake structure
4.	Outlet Works - Control Tower	RGL,DLS	Stone masonry structure inaccessible
5.	Outlet Works - Transition and Conduit	RGL,DLS	Unknown
6.	Outlet Works - Outlet Structure and Channel	RGL,DLS	Could not be found
7.	Outlet Works - Spill. Weir, Appr. & Disch.	RGL,DLS	Stone masonry deteriorated. Some seepage through weir.
8.			
9.			
10.			
11.			
12.			

PERIODIC INSPECTION CHECK LIST

PROJECT: Upper Lake Phipps Dam No. 1 DATE: 5/6/80

PROJECT FEATURE: Dam Embankment NAME: RGL,DLS

DISCIPLINE: Civil and Geotechnical Engineers NAME: RM

AREA ELEVATION	CONDITIONS
DAM EMBANKMENT	
CREST ELEVATION	63.3
CURRENT POOL ELEVATION	59.8
MAXIMUM IMPOUNDMENT TO DATE	61.0, March 1980 (maximum known)
SURFACE CRACKS	None observed
PAVEMENT CONDITION	Not paved - bare path
MOVEMENT OR SETTLEMENT OF CREST	Crest surface somewhat irregular, maybe settlement near stone masonry chamber
LATERAL MOVEMENT	None observed
VERTICAL ALIGNMENT	Maybe some settlement near stone masonry chamber
HORIZONTAL ALIGNMENT	Good
CONDITION AT ABUTMENT AND AT CONCRETE STRUCTURES	Some surface erosion has occurred adjacent to outlet chamber on downstream slope.
INDICATIONS OF MOVEMENT OF STRUCTURAL ITEMS ON SLOPES	None observed
TRESPASSING ON SLOPES	Many paths worn bare due to pedestrian traffic.
VEGETATION ON SLOPES	Brush, large and small trees on crest and upstream and downstream slopes
SLOUGHING OR EROSION OF SLOPES OR ABUTMENTS	Erosion has occurred on both upstream and downstream slopes
ROCK SLOPE PROTECTION - RIPRAP FAILURES	No riprap on upstream slopes
UNUSUAL MOVEMENT OR CRACKING AT OR NEAR TOES	None observed
UNUSUAL EMBANKMENT OR DOWNSTREAM SEEPAGE	Seepage noted on downstream slope and along the toe of right side of the dam
PIPING OR BOILS	None observed
FOUNDATION DRAINAGE FEATURES	None observed
TOE DRAINS	None observed
INSTRUMENTATION SYSTEM	None

PERIODIC INSPECTION CHECK LIST

PROJECT: Upper Lake Phipps Dam No. 2 DATE: 5/6/80

PROJECT FEATURE: Dam Embankment NAME: RGL,DLS

DISCIPLINE: Civil and Geotechnical Engineers NAME: RM

AREA EVALUATED	CONDITIONS
DAM EMBANKMENT	
CREST ELEVATION	63.0±
CURRENT POOL ELEVATION	59.8
MAXIMUM IMPOUNDMENT TO DATE	61.0, March 1980 (maximum known)
SURFACE CRACKS	None observed
PAVEMENT CONDITION	Not paved, bare path
MOVEMENT OR SETTLEMENT OF CREST	Crest surface somewhat irregular
LATERAL MOVEMENT	None observed
VERTICAL ALIGNMENT	Crest surface somewhat irregular
HORIZONTAL ALIGNMENT	Good
CONDITIONS AT ABUTMENT AND AT CONCRETE STRUCTURES	Fair
INDICATIONS OF MOVEMENT OF STRUCTURAL ITEMS ON SLOPES	Lateral movement of spillway training wall
TRESPASSING ON SLOPES	Some evidence of tresspassing on upstream slope
VEGETATION ON SLOPES	Vegetation on upstream slope. Extensive vegetation and debris adjacent to downstream wall.
SLOUGHING OR EROSION OF SLOPES OR ABUTMENTS	Erosion on upstream slopes
ROCK SLOPE PROTECTION - RIPRAP FAILURE	None observed
UNUSUAL MOVEMENT OR CRACKING AT OR NEAR TOES	None observed
UNUSUAL EMBANKMENT OR DOWNSTREAM SEEPAGE	Some seepage along toe of downstream masonry wall.
PIPING OR BOILS	None observed
FOUNDATION DRAINAGE FEATURES	None
TOE DRAINS	None
INSTRUMENTATION SYSTEM	None

OTHER: Downstream masonry wall and butresses deteriorated

PERIODIC INSPECTION CHECK LIST

PROJECT: Upper Lake Phillps Dam No. 1 DATE: 5/6/80

PROJECT FEATURE: Outlet Works - Intake Channel and Intake Structure NAME: RGL

DISCIPLINE: Civil Engineer NAME: DLS

AREA EVALUATED	CONDITIONS
OUTLET WORKS - INTAKE CHANNEL AND INTAKE STRUCTURE	
A. APPROACH CHANNEL:	Not observed - under water
SLOPE CONDITIONS	
BOTTOM CONDITIONS	
ROCK SLIDES OR FALLS	N/A
LOG BOOM	N/A
DEBRIS	N/A
CONDITION OF CONCRETE LINING	
DRAINS OR WEEP HOLES	
B. INTAKE STRUCTURE:	
CONDITION OF CONCRETE	Partial remains of a concrete masonry structure upstream of dam
STOP LOGS AND SLOTS	N/A

PERIODIC INSPECTION CHECK LIST

PROJECT: Upper Lake Phipps Dam No. 1 DATE: 5/6/80

PROJECT FEATURE: Outlet Works - Control Tower NAME: RGL

DISCIPLINE: Civil Engineer NAME: DLS

AREA EVALUATED	CONDITIONS
OUTLET WORKS - CONTROL TOWER	
A. CONCRETE AND STRUCTURAL:	
GENERAL CONDITION	Stone masonry structure with steel and concrete covers
CONDITION OF JOINTS	Good
SPALLING	N/A
VISIBLE REINFORCING	None
RUSTING OR STAINING OF CONCRETE	None
ANY SEEPAGE OR EFFLORESCENCE	None observed
JOINT ALIGNMENT	Good
UNUSUAL SEEPAGE OR LEAKS IN GATE CHAMBER	Chamber could not be observed because of covers
CRACKS	None observed
RUSTING OR CORROSION OF STEEL	Could not be observed
B. MECHANICAL AND ELECTRICAL:	
AIR VENTS	N/A
FLOAT WELLS	N/A
CRANE HOIST	N/A
ELEVATOR	N/A
HYDRAULIC SYSTEM	N/A
SERVICE GATES	Blowoff gate reported downstream could not be located
EMERGENCY GATES	N/A
LIGHTNING PROTECTION SYSTEM	N/A
EMERGENCY POWER SYSTEM	N/A
WIRING AND LIGHTING SYSTEM IN GATE CHAMBER	N/A

PERIODIC INSPECTION CHECK LIST

PROJECT: Upper Lake Phipps Dam No. 1 DATE: 5/6/80

PROJECT FEATURE: Outlet Works - Transition and Conduit NAME: RGL

DISCIPLINE: Civil Engineer NAME: DLS

AREA EVALUATED	CONDITIONS
OUTLET WORKS - TRANSITION AND CONDUIT	
GENERAL CONDITION OF CONCRETE	Conduit location, size and type unknown.
RUST OR STAINING ON CONCRETE	
SPALLING	
EROSION OR CAVITATION	
CRACKING	
ALIGNMENT OF MONOLITHS	
ALIGNMENT OF JOINTS	
NUMBERING OF MONOLITHS	

PERIODIC INSPECTION CHECK LIST

PROJECT: Upper Lake Phipps Dam No. 1 DATE: 5/6/80

PROJECT FEATURE: Outlet Works - Outlet Structure and Outlet Channel NAME: RGL

DISCIPLINE: Civil Engineer NAME: DLS

AREA EVALUATED	CONDITIONS
OUTLET WORKS - OUTLET STRUCTURE AND OUTLET CHANNEL	
GENERAL CONDITION OF CONCRETE	Discharge end of reported blowoff line could not be located
RUST OR STAINING	
SPALLING	
EROSION OR CAVITATION	
VISIBLE REINFORCING	
ANY SEEPAGE OR EFFLORESCENCE	
CONDITION AT JOINTS	
DRAIN HOLES	
CHANNEL	
LOOSE ROCK OR TREES OVERHANGING CHANNEL	
CONDITION OF DISCHARGE CHANNEL	

PERIODIC INSPECTION CHECK LIST

PROJECT: Upper Lake Phipps Dam No. 2 DATE: 5/6/80

PROJECT FEATURE: Outlet Works - Spillway Weir, Approach & Discharge Channel NAME: RGL,DLS

DISCIPLINE: Geotechnical Engineers NAME: RM

AREA EVALUATED	CONDITIONS
OUTLET WORKS - SPILLWAY WEIR, APPROACH AND DISCHARGE CHANNELS	
A. APPROACH CHANNEL:	Partially under water
GENERAL CONDITION	Good, new concrete cap
LOOSE ROCK OVERHANGING CHANNEL	None
TREES OVERHANGING CHANNEL	None
FLOOR OF APPROACH CHANNEL	Under water
B. WEIR AND TRAINING WALLS:	
GENERAL CONDITION OF CONCRETE	Stone masonry deteriorated. Crest of weir recently repaired with concrete
RUST OR STAINING	None observed
SPALLING	None observed
ANY VISIBLE REINFORCING	None observed
ANY SEEPAGE OR EFFLORESCENCE	Seepage under and through stone masonry weir
DRAIN HOLES	None
C. DISCHARGE CHANNEL:	
GENERAL CONDITION	Fair
LOOSE ROCK OVERHANGING CHANNEL	None
TREES OVERHANGING CHANNEL	Trees and brush on both sides of channel
FLOOR OF CHANNEL	Bedrock surface leading to culverts at roadway
OTHER OBSTRUCTIONS	Brush and debris in channel

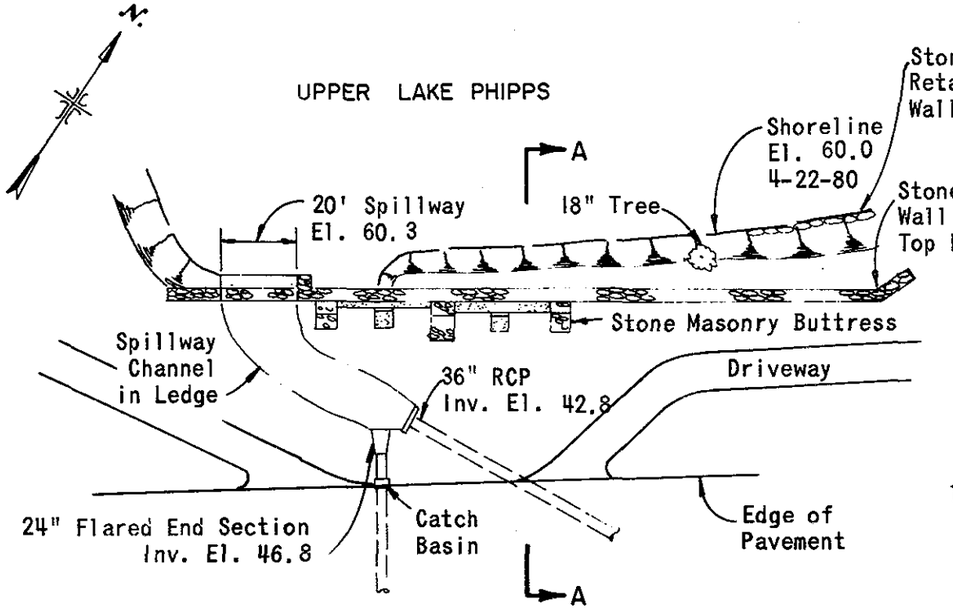
OTHER: Discharge channel flows to 24" and 30" RCP culverts under roadway.

APPENDIX B

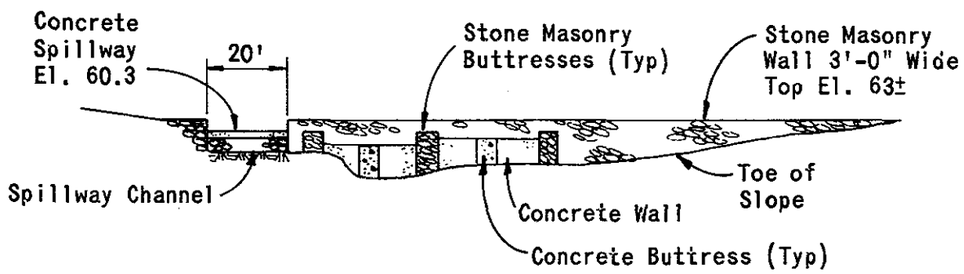
ENGINEERING DATA

FIGURE 2

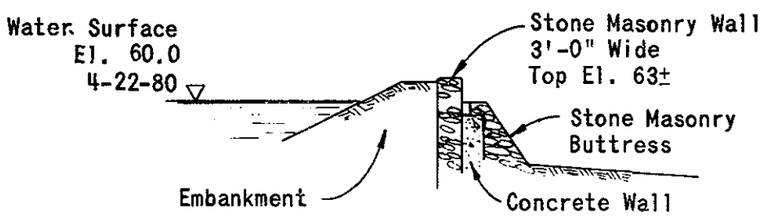
UPPER LAKE PHIPPS



PLAN
Scale: 1" = 40'



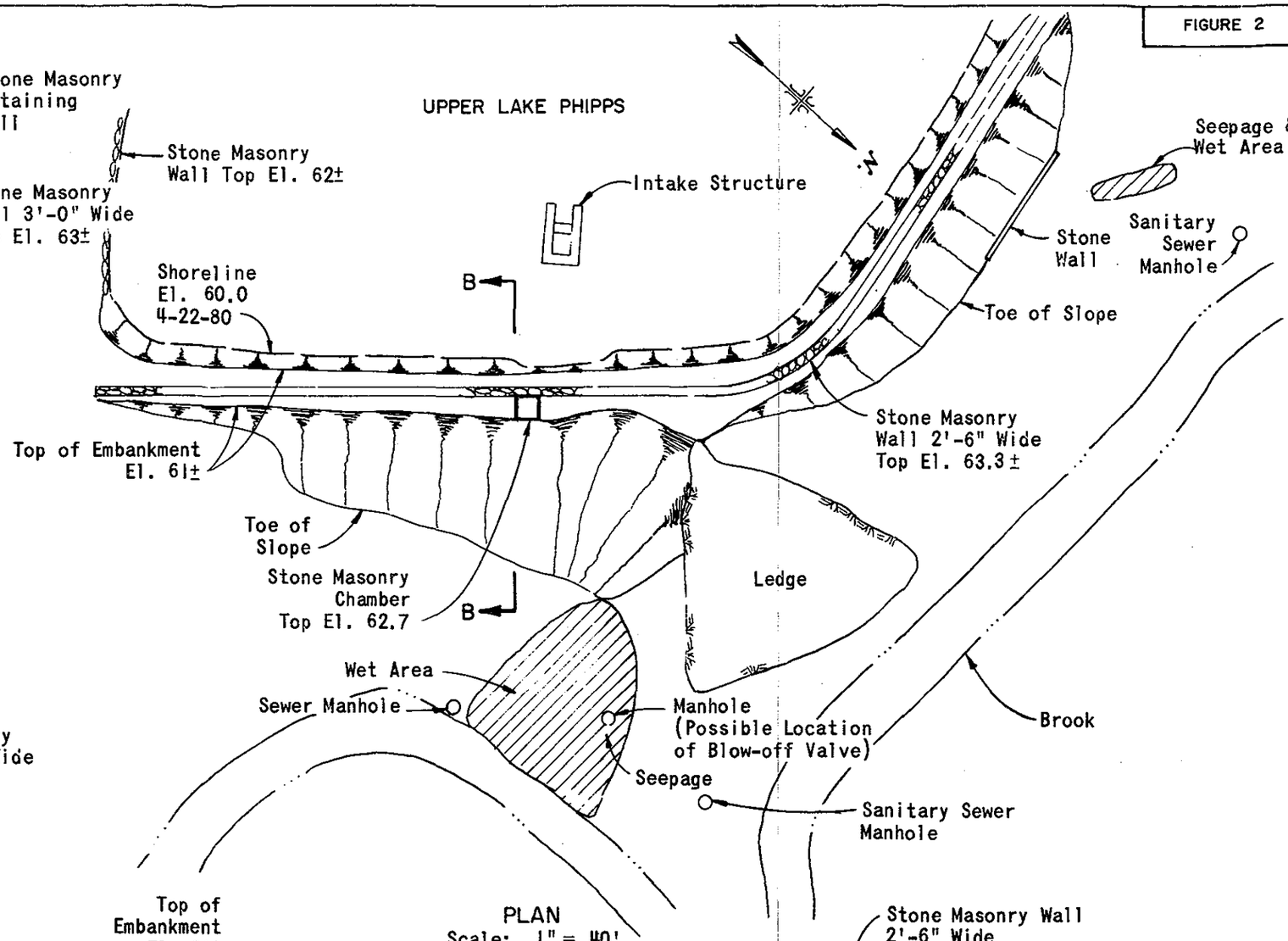
ELEVATION
Scale: 1" = 40'



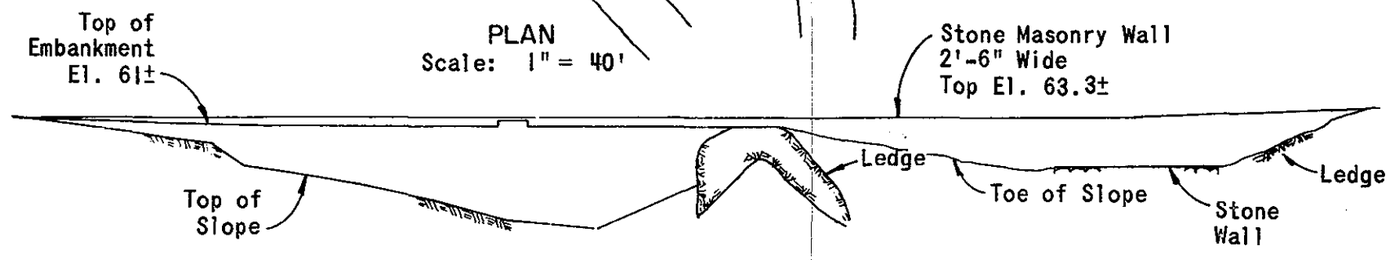
SECTION A-A
Scale: 1" = 20'

DAM NO. 2

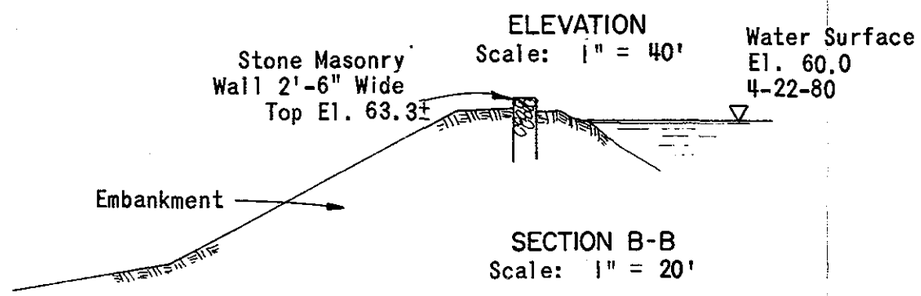
UPPER LAKE PHIPPS



PLAN
Scale: 1" = 40'



ELEVATION
Scale: 1" = 40'



SECTION B-B
Scale: 1" = 20'

DAM NO. 1

ROALD HAESTAD, INC. *CONSULTING ENGINEERS* WATERBURY, CONNECTICUT	U.S. ARMY ENGINEER DIV. NEW ENGLAND *CORPS OF ENGINEERS* WALTHAM, MASS.

NATIONAL PROGRAM OF INSPECTION OF NON-FED. DAMS

UPPER LAKE PHIPPS DAM

DRAWN	CHECKED	APPROVED	SCALES AS NOTED
JRS	RGL	RH	DATE JULY 1980 PAGE B-1

LIST OF REFERENCES

The following references are located at the Department of Environmental Protection, Office of the Superintendent of Dams, State Office Building, Hartford, Connecticut.

1. Inspection Report, "Lake Phipps Dams", by A. M. McKenzie, Civil Engineer, dated March 23, 1966.

2. Letter from William H. O'Brien III, Civil Engineer, Water Resources Commission to the Lake Phipps Land Owners Corporation, dated June 4, 1969.

3. Letter from Lake Phipps Land Owners Corporation to William H. O'Brien III, Water Resources Commission, dated June 13, 1969.

4. Letter from William H. O'Brien III, Water Resources Commission, to Lake Phipps Land Owners Corporation, June 30, 1969.

5. Memo to File from William H. O'Brien III, Water Resources Commission, March 4, 1970, proposed modifications to Lake Phipps spillways.

6. Memo to File from William H. O'Brien III, Water Resources Commission, dated March 11, 1971, Summary of Correspondence, Upper Lake Phipps Dams, March 23, 1966, to February 17, 1971.

7. Inspection Report "Upper Lake Phipps Dams" by Buck & Buck Engineers for Department of Environmental Protection, Water and Related Resources, dated February 14, 1972.

8. Letter from Nicholas Piperas, Jr., of Clarence Blair Associates, to William A. Delong, President, Lake Phipps Land Owners Corporation dated April 18, 1972.

9. Letter and Prints from Nicholas Piperas, Jr., Clarence Blair Associates, to William H. O'Brien III, Department of Environmental Protection, showing proposed repairs, dated May 19, 1972.

10. Construction Permit for Dam, State Department of Environmental Protection to Lake Phipps Land Owners Corporation, dated August 16, 1972.

11. Letter from Morgan S. Ely, State Water and Related Resources, to Lake Phipps Land Owners Corporation, dated May 17, 1973, concerning lack of progress on repairs.

12. Memo from Charles J. Pelletier to Victor F. Galgowski, Superintendent of Dam Maintenance, dated November 22, 1976, concerning inspection of Upper Lake Phipps Dam.

13. Letter from Stanley J. Pac, Commissioner, Department of Environmental Protection, to Honorable Carl R. Ajello, State Attorney General, dated January 17, 1978, requesting legal steps to affect repair of dam.

14. Letter from Victor F. Galgowski, Superintendent of Dam Maintenance, State Water Resources Unit, to John H. Peck, Esq., Reilly, Peck, Raffile & Lasala, dated May 4, 1978, concerning repairs required to satisfy State Order.

15. Inspection Report by James A Thompson, Buck & Buck Engineers, to Victor Galgowski, Superintendent of Dams, dated January 15, 1980.

16. Letter from James A Thompson, Buck & Buck Engineers, to Victor Galgowski, Superintendent of Dams, dated January 15, 1980, concerning spillway capacity of the dam.

17. Many other letters and memos too numerous to list individually.

The following reference is located at Clarence Blair Associates, 93 Whitney Avenue, New Haven, Connecticut:

18. Plans "Upper Lake Phipps, Plans of Repairs and Alterations to Dams #1 & #2 and Map of Dam #3, West Haven, Connecticut", dated June 15, 1972.

A. M. McKENZIE
CIVIL ENGINEER
M. AM. SOC. C. E.

HYDRAULICS
WATER SUPPLY
LAND DEVELOPMENT

1300 MAIN STREET
SOUTH MERIDEN, CONN.

March 23, 1966.

Water Resources Commission,
State of Connecticut,
State Office Building,
Hartford, 15,
Connecticut.

Ref: Lake Phipps Dams
West Haven,
New Haven Quad.

Gentlemen:

As instructed in your letter of March 18, I have visited the above site and find that there are two lakes involved. You probably have in mind the dam forming the lower lake but this report covers both lakes.

LOWER LAKE PHIPPS.

The dam forming the lower lake, which is at elevation about 25, is some 600' southwest of Sawmill Road in West Haven. The lake is about 1200' long and varies from 100' to 200' in width. It is in a thickly populated and industrial area.

The overall length of the dam is 150' with a maximum height of 16' at the center. It is constructed entirely of stone masonry, the stone probably having been taken from the ledge which crops out at both ends of the dam. The stone is a very soft, friable shale; much of it can be crumpled in the fingers. There is a section in the center, 50' long, forming a spillway, on which a concrete cap 6" to 8" thick has been poured at some time since the dam was built. At the south end of the concrete spillway there is a section 8' long which has fallen out and the entire flow of the stream passes thru the break. See photos # . There is no visible drain thru the dam altho there might have been some sort of an outlet at one time as a local resident states that the lake was formerly a part of the local domestic water supply. The water is now muddy and probably highly contaminated.

The entire structure is in very poor condition and is rapidly falling to pieces. The shale from which it is built is disintegrating, the mortar is falling from the joints and there are two large holes in the downstream face where the masonry has fallen out - see photos # . The lower lake dam is definitely a hazard and, in case of failure, would undoubtedly cause considerable property damage and perhaps loss of life. About 800' below the dam the stream, Cove River, passes under West Main Street thru a concrete box culvert 10' wide and 3' high. The channel above the culvert is very much clogged with

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all sorts of rubbish and brush and, in case of flood, the culvert would probably be stopped up. The drainage area above the lower dam is about 2½ square miles.

It is my considered opinion that the lower dam should be entirely removed. The only alternate is a completely new structure which, under the circumstances, does not seem worth while. The lake serves no purpose whatsoever, the water is highly contaminated after flowing thru a thickly populated area. A long time resident whose property borders the lake stated that " the lake is only a breeding area for mosquitos and is a danger spot for children living near it".

The problem of removing the lower lake dam does not appear to be serious. The lake does not contain a great quantity of water and only that part immediately above the dam is of any depth. If The Commission is interested I am prepared to suggest a way of carrying out the demolition.

UPPER LAKE PHIPPS

The surface of Upper Lake Phipps is at Elev. 60 and now has no connection to the lower lake. I believe that a pipe line connecting the two lakes is still in place but the valve at the inlet end, in a stone masonry pit - see photo # - is permanently fastened in a closed position..This information came from a member of the Lake Phipps Association who lives at the east end of the lake. The Lake is now used for recreational purposes only and the entire shore line is closely built up.

At the east end of the Upper Lake is an earth embankment, or dike, nearly 400' long, varying in height from 0 to about 40' at a point near the valve pit referred to in the paragraph above. Extending along the center of the dike, and visible for most of it's length, is a stone masonry core wall 2' thick. Where exposed it seems to be built of the same shale as the lower dam but, on the surface, is in good condition. The depth of the core wall is not known. The top width of the dike is 10' to 12' and the downstream slope varies from 1 : 1 to 1½ : 1. The downstream slope is in good condition, there are many trees on it of a size which would indicate an age of over 50 years and there is a slight amount of erosion in only one place near the valve pit. There is no protection on the lake side of the dike but there are many trees along the water's edge and only a very slight erosion is shown in photo # . There is no everflow section in this dike.

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On the south side of the Lake, toward the west end and very close to West Main Street, is a stone masonry dam about 200' long which does have a spillway. The stone masonry is of the same soft shale, has a maximum height of 15', a thickness of 3' at the top and is reinforced with 4 abutments about 6' wide - see photos # . Part of the down stream face has been further reinforced with 12" of concrete poured against the stone work. The entire stone masonry is in a fair state of repair. The masonry is backed up on the upstream side with 6' to 8' of earth fill except, toward the west end where about 20' of the fill has been washed out down to water level. Very close to the west end of the dam is a concrete spillway; it's elevation is 3' below the main part of the structure and it's length is 20'. The spillway is on ledge rock (shale) which is exposed here - see photo # . This spillway is the only overflow from the Upper Lake and on the date of the inspection a very small trickle was coming over.

The water shed draining into the Upper Lake is very small; little more than the area between the lake and the RR. The topo map indicates a small stream coming in from the north; as of this date there was not enough water here to fill a 2"ø pipe. Possibly the recent construction of the Thruway has changed the drainage plan. Also, the Lake may be partially spring fed. Most of the residences along the south shore have walls, docks, paving or rip-rap along the water line. There is no indication that water level varies much from season to season. The overflow is taken by a 24"ø concrete pipe which runs under West Main Street and across the house lot at the corner of Hilltop Lane to discharge into a open channel running about S. E. in the rear of the houses on Hilltop Lane. Apparently there has been no recent flood here as there is no sign of wash-out along West Main Street.

The earth dike at the east end of the Lake is in good condition; the only repair recommended there is the replacement of the earth fill in two small areas near the valve pit. When the fill on the lake side has been placed some stone rip-rap should be dumped over it for protection against any slight wave action. There is more to be done at the masonry dam on West Main Street. The upstream wing wall on the east end of the spillway must be rebuilt - it is entirely gone- and the earth embankment rebuilt with properly compacted fill. Some stone rip-rap should be placed here, also. See photos of present condition. *

The spillway of the dam is only some 35' from the edge of the pavement on west Main and the entire masonry structure is not in the best of condition. Any failure would be hazardous; would probably result in much property damage and possible loss of life. The entire area below is thickly built up.

A. M. McKENZIE
CIVIL ENGINEER
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I believe that the Lake is controlled by a responsible group of property owners bordering on it and, of course, these owners have a very large investment so it should not be difficult to get the repairs recommended done at once, preferably this summer. The dam should be inspected every year.

I am not sure that the Lower Lake is controlled by the Lake Phipps Association; that point will have to be checked.

Yours very truly

A. M. McKenzie

Enclosure - 9 Photographs. - Lower Lake
2 " Upper Lake
* more photos to come.

June 4, 1969

The Lake Phipps Land Owners Corp.
c/o Mr. Herbert Schroeder, President
103 Lake Avenue
West Haven, Connecticut

Subject: Upper Lake Phipps Dams
West Haven, Connecticut

Gentlemen:

According to the records in this office, you are the owners of the dams on Upper Lake Phipps.

Per the General Statutes of Connecticut, copy enclosed, the Water Resources Commission has jurisdiction over all dams in the State "- - which by breaking away or otherwise, might endanger life or property- -". These dams could endanger life or property in the event of failure and are therefore under the jurisdiction of the Water Resources Commission.

These dams were recently inspected and it was found that they were in need of some repair work to keep them in a safe condition. The minimum work should consist of but not necessarily be limited to the following:

Dam #1 - main dam at the northeast end of the lake.

1. There are numerous trees on the dam which should be removed to prevent root damage to the dam and possible damage from uprooting in a storm.

2. The upstream slope should be protected against wave action.

3. Under Section 25-111 of the 1963 Supplement to the General Statutes, we request you furnish us with surveys, plans, descriptions, drawings or specifications on this dam. It is our understanding that the dam was designed by A. B. Hill.

4. We understand that the draw-down or draw-off pipe valve may be permanently fastened in a closed position. We would like to have a plan or description of the complete outlet system.

Dam #2 - dam at the south end of the lake just north of West Main Street.

1. All trees should be removed from the upstream earth fill of this dam.

2. The upstream wing walls have deteriorated and should be rebuilt.

3. Repair the downstream wall at the east end of the dam.

4. Because the east wing wall has broken off, about 20 feet of the upstream earth embankment has washed out and should be replaced and protected.

5. The top of the masonry wall should be leveled.

6. Under Section 25-111 of the 1963 Supplement to the General Statutes, we request that you furnish us with surveys, plans, descriptions, drawings or specifications on the dam, both for the original structure and modifications since then.

There apparently were other dams on this lake at one time in the north end which may be partially submerged now. Any information that you could supply on these would be helpful.

There is currently a study of flooding problems on the Cove River on being carried out under contract to this agency. In this report, recommendations may be made of how the spillway at Dam #2 might be altered to alleviate local flooding of rear yards on Wildwood Terrace. You may wish to consider such recommendations in your repair work.

Plans for these repairs should be submitted to this office for approval prepared by an engineer registered in the State of Connecticut and bearing his certification and seal. Such plans should be submitted by August 8, 1969.

We would like a reply as to your intentions at your earliest convenience.

Very truly yours,

William H. O'Brien III
Civil Engineer

WHOIII:vhb

LAKE PHIPPS LAND OWNERS CORP.
103 Lake Avenue
West Haven, Connecticut, 06516

June 13, 1969

STATE WATER RESOURCE COMMISSION
RECEIVED
JUN 16 1969
ANSWERED
REFERRED
FILED

Mr. William H. O'Brien, III
Water Resources Commission
State Office Building
Hartford, Connecticut 06115

Subject: Upper Lake Phipps Dams

Dear Sir:

We have numbered the paragraphs and points in your letter of June 4th, copy attached, in an effort to respond to each observation. On page 1. there are seven paragraphs, and page 2. contains numbers 8 - 18.

However, before replying to your June 4th letter, we wish to call your attention to previous engineer's reports concerning the type and extent of repairs necessary to recondition the dams at Lake Phipps - your most recent letter has extended these recommendations.

Taking each paragraph in sequence:

1. Yes, we are the owners of the dams in upper Lake Phipps.

2. We most certainly would not want the dams to be in such condition that life or property may be endangered.

3. If you will refer to your files, you will note from previous correspondence that we have been trying for over a year to engage the Blair Associates of New Haven to inspect the dams, and to submit plans for a permit to repair them. For one reason or another, they have not submitted plans or other specifications.

4. It is a matter of judgment as to whether or not the trees have an adverse effect, or would have any effect on the dams' stability.

5. As no power boats are permitted on this lake, there is no wave action except that caused by an unusually high wind; because of our years of experience, we believe the structure of the dams would be unaffected by this.

6. We purchased Lake Phipps and its dams in 1957, and have no plans or specifications on the way the dams were built - with the exception that we understand they are 'gravity type' dams. We do not know where the original structural plans can be obtained.

7. We also understand that the draw-down pipe valve has been permanently fastened, but we have no plans, nor do we know where they can be secured.

8., Page 2.
We assume that dam #2 is the dam with the water overflow, located north of West Main Street.

9. As this dam is also a gravity type structure extending many feet back into the lake, we feel that tree roots have little effect on its safety.

Upper Lake Phipps Dams, continued:
Paragraph:

10. We were aware of the need of repairs to the wings at your first writing (and would have made adequate repairs at that time), but were warned by your Commission not to proceed without proper specifications and drawings.

11. This is answered in paragraph 10.

12. The embankment on the lake side of the east wall has not washed out; Testification by residents of over thirty years' tenure is that the embankment is unchanged, and has remained the same throughout this period.

13. We do not understand this. (Dam #2, point 5.)

14. We do not possess plans or specifications for the original dams - refer to our answer in paragraph 6.

15. To our best knowledge, there is no other dam or submerged structure in this lake.

16. The ultimate flow of water from Lake Phipps must pass through a 24 inch storm sewer, approximately 1,500 feet long. The flooding on Wildwood Terrace is caused mainly by this restriction of the flow.

The storm sewer was installed by the City of West Haven to facilitate the construction of the Wildwood Terrace housing development. Prior to its installation, there was a free-flowing, open brook terminating in a pond, which amply accommodated any overflow from Lake Phipps. We have not altered the lake itself in any way that might cause an increase in the volume of waterflow over this dam.

17. The alterations you specify apparently are too small for any 'professional' in this area to undertake. We have contacted the Blakeslee Company, Blair Associates and others, for assistance with this problem, with no results.

18. Without your assistance, we see no way to meet your August 8th deadline.

Note: This is a small corporation whose stockholders are residents of the lake community. The corporation has no powers of assessment, and therefore has no means of income.

Is there any Federal or State agency whose interest in the preservation and maintenance of natural resources might extend to assistance with the problems of a privately owned lake, such as ours?

Very truly yours,

Herbert Schroeder for
Lake Phipps Land Owners Corp.

HS:ed

Herbert Schroeder, President

June 30, 1969

The Lake Phipps Land Owners Corp.
c/o Mr. Herbert Schroeder, Pres.
103 Lake Avenue
West Haven, Connecticut

Subject: Upper Lake Phipps Dam
West Haven, Connecticut

Dear Mr. Schroeder:

Thank you for your letter of June 13, 1969 regarding the subject dam. We have the following comments on your numbered paragraphs:

3. We believe that if you make a very firm request that Blair Associates undertake this work, they would be willing to do so. If you desire them to do the work (they would be most familiar with the situation) we suggest that you write to them again. There are, of course, many other qualified engineering firms in the State.

4. Quoting from texts on the subject of trees on dams: "A. Low Dams - National Resources Committee - 1938, Page 147 - "Trees should not be used because their heavy roots penetrate too far into the dam:"

B. Civil Engineering Handbook - Urquhart - Fourth Edition - 1959, Page 10-18 "Vegetation with long root structures should be avoided."

There have been some instances of dams failing in Connecticut due to trees uprooting in a storm and ripping a hole in the dam. We do not consider the adverse effect of trees on dams as "-- a matter of judgement --", but as a source of weakness in the structure which should be removed. On a dam of this size and importance, it may also be necessary to remove the root systems. We would like the comments of your engineers on this subject.

5. Wave action from boats is not a problem, but it appears that there has been some slight erosion of the upstream embankment. Extensive rip-raping may not be necessary, but some measures should be taken to reverse this gradual deterioration.

8. Dam #2 is what we have called the dam with the overflow north of West Main Street.

9. This matter may be reconsidered with supporting evidence from your engineer that trees could not endanger this particular structure.

12. We have an engineering consultant's report dated March 23, 1966 that says that part of this embankment was washed out. We would like comment by your engineer.

13. There are some low spots in the top of the masonry and if water should ever rise to that level, it would cause an undesireable concentration of flow and possible "erosion" at these points.

17. We suggest that you contact Blair Associates again. If you still have trouble obtaining an engineer, please let us know.

We are not aware of any Federal or State money that might be available for such repair work. Please keep us informed of your progress and as to when we may expect to receive plans.

Very truly yours,

William H. O'Brien III
Civil Engineer

WHO:vhb

STO 201

INTERDEPARTMENT MAIL

DATE
March 4, 1970

DEPARTMENT

DEPARTMENT
Water Resources Commission

am H. O'Brien III, Civil Engineer

Lake Phipps Dams, West Haven

Frank Ragaini's report entitled "Flood Control Report Cove River" dated June 1969 (received January, 1970±) has suggestions concerning the subject dams.

1. Dam No. 1 - This is actually a dike with no overflow and is the largest structure on the lake and is at the north east end of the lake. Mr. Ragaini proposes that the existing spillway on Dam No. 2 be shortened to lessen the discharge to avoid flooding in that area, and that a spillway be built (apparently in natural ground) just to the southwest of Dam No. 1. This proposed construction would require that detail plans be submitted prepared by an engineer registered in the State of Connecticut. This does not affect the necessity of carrying out the other work as specified in our letter of June 4, 1969. There may be a question of who would pay for the construction of this spillway (est. $12,000)

   The designed (proposed) spillway has the capacity of discharging approximately 130 CFS with 2 feet of freeboard. In a storm producing a run-off of 8 x mean annual flood (approximately a 500 year event), the maximum discharge from the lake would be 80 CFS. It would therefore appear that the spillway is adequately designed from a hydraulic standpoint.

   The drainage area for the lake is approximately 200 acres with a pond area of approximately 30 acres. a discharge of 80 C.F.S. seems reasonable as a design outflow.

2. Dam No. 2 - This is the dam with the spillway at the south-west end of the lake.

   In his report, Mr. Ragaini suggests that the length of the spillway be shortened from 20 feet to 2 feet to match the discharge more closely with the capicity of the 24 inch culvert pipe. The estimated cost for this work is $1,000.

   This recommendation does not change the requests for repair work as itemized in our letter to the owner dated June 4, 1969 but would be in addition to them, if the recommendations in the report are implemented. There may also be a question in this instance as to who pays for the shortening of the spillway.

jad B-14 W.H.O'Brien III Civil Engineer

NTERDEPARTMENT MESSAGE

SAVE TIME: *Handwritten messages are acceptable. Use carbon if you really need a copy. If typewritten, ignore faint lines.*

SO-201 12-69

TO	AGENCY	DATE
FILE		March 11, 1971
FROM	AGENCY	TELEPHONE
William H. O'Brien III Civil Engineer	Water Resources	

SUBJECT File Summary - Upper Lake Phipps Dam(s) West Haven. Dam #1 (main dike at NE end of lake) & Dam #2 (with overflow spillway at SW end of lake)

March 23, 1966 - letter from Water Resources Commission consultant, A.M. McKenzie to Water Resources Commission.

1. DAM #1

a) "...believe that a pipe line connecting the two lakes (Upper and Lower Lake Phipps) is still in place but the valve at the inlet end, in a stone masonry pit - see photo #8 - is permanen fastened in closed position."

b) Has a stone masonry cove wall 2 feet thick, downstream slope varies from 1:1 to 1½:1; many trees with approximate age of 50 years on downstream slope; very slight erosion on unprotected upstream slope and many trees along water's edge.

c) Dike is in good condition, the only repair recommended is replace earth fill in two small areas near valve pit and protected with rip-rap.

2. DAM #2

a) Dam is a stone masonry dam of soft shale, maximum height of 15 feet, thickness = 3 feet. Part of downstream face has been reinforced with 12 inches of concrete poured against the stone work. "Entire stone masonry in fair state of repair." (First paragraph, page 3) Masonry backed up on upstream side with 6 feet to 8 feet of earth fill except toward west end where approximately 20 feet of fill has been washed down to water level. The spillway is on shale ledge rock. "...the entire masonry structure is not in the best of condition." (last paragraph page 3) Any failure would be hazardous.

March 28, 1966 - letter from Water Resources Commission to Mr.Philip Jewet Lake Phipps Land Owners Association. Dams in need of repair, notify us within two weeks what steps you plan to take to repair, - necessary to submit plans for a Construction Permit.

March 31, 1966 - letter from Mr. Philip Jewett to Water Resources Commission - Repairs are a mystery to him - he is only the treasurer Address letters to Herbert Schroeder, President.

April 4, 1966 - letter from Water Resources Commission to Mr. Schroeder

1. DAM #1

a) replace fill in two small areas near valve pit and protect with rip-rap.

2. DAM #2

a) repair upstream wing wall and rebuild embankment with properly compacted fill and protect with rip-rap.

b) First necessary to obtain Construction Permit.

April 14, 1966 - letter from Herbert Schroeder - Thanks for letter - will ask C. W. Blakeslee & Sons, Inc. of New Haven to give us recommendations on rip-rap. Will write you further.

April 15, 1966 - letter from Water Resources Commission to Mr. Schroeder We have received your letter. Caution you to first obtain a Construction Permit before undertaking repairs.

May 5, 1966 - letter from Mr. Schroeder to Water Resources Commission Blakeslee suggested calling in Blair Associates to make up plans. We will write you when they report to us on their inspection of May 4, 1966.

October 17, 1966 - letter from Water Resources Commission to Mr. Schroeder When might we expect to receive report from Blair Associates?

November 17, 1966 - letter from A. M. McKenzie to Water Resources Commissio Frank Ragaini (Blair Associates) requested me to meet with him and we met at the dam with Mr. Schroeder yesterday. Wish to clarify points of March 23, 1966 report.

1. DAM #2

Flooding of West Main Street and property below the spillway due to inadequately sized drainage pipes.

July 18, 1967 - letter from Mr. Schroeder to Water Resources Commission
Delay in submission of plans is due to negotiations with city on Lower Lake Phipps Dam. As soon as this is settled, we expect to submit plans. Greatly appreciate your patience.

May 9, 1968 - letter from Water Resources Commission to Mr. Schrooder
Per telephone conversation with Mr. William DeLong of your corporation in April, he thought that a new overflow had been installed on the Upper Lake Phipps Dam some six to eight months ago, possibly by the town. Would like to hear from you or your corporation by May 23, 1968 as to what has been done and what are your intentions.

May 17, 1968 - letter from Mr. Schroeder to Water Resources Commission
City took over Lower Lake Phipps in September, 1967. I have talked to Mr. Frank Ragaini (Blair Associates) about plans and he will meet with city officials and your department and make up plans. You should hear from him in near future.

June 5, 1968 - Memo to file from William H. O'Brien III and Charles J. Pelletier. Mr. O'Brien and Mr. Pelletier of Water Resources Commission met with Mayor Zarnowski, Albert McGrail, Public Works Director and Ralph Spang, City Engineer of West Haven on June 4, 1968.

1. DAM #2

a) Observation: flooding problem downstream of spillway might be solved by raising spillway and diverting flow via pipe or natural swale at the north end of the lake into Cove River.

June 13, 1968 - letter from Water Resources Commission to Frank Ragaini
Please inform us of status of project (per 5/17/68 letter from Schroeder)

May 7, 1969 - memo to file from William H. O'Brien III

1. DAM #2

a) Telephone call from Representative John D. Prete expressing concern over leaks through dam. Will advise him of our findings.

O	AGENCY	DATE
ROM	AGENCY	TELEPHONE

UBJECT

June 4, 1969 - memo to file from William H. O'Brien III

1. DAM #2

a) Inspection of dam and flooding problems below on May 22, 1969 at request of Michael Rossetti of State Health Department. (also septic tank problems in rear yards associated with flooding). Flooding due to inadequately sized pipe under Wildwood Terrace causing back-up of spillway overflow into back yards. Not under jurisdiction of Water Resources Commission. Relief may be provided for in flood study of Cove River by Blair Associates.

June 4, 1969 - letter from Water Resources Commission to Louis Filipelli, Town Sanitarian - enclosed is copy of our memo of June 4, 1969.

June 4, 1969 - inter-departmental memo from Water Resources Commission to Michael Rossetti, Senior Sanitarian, Health Department. Enclos is copy of our memo of June 4, 1969.

June 4, 1969 - letter from Water Resources Commission to Mr. Schroeder Dams are in need of repair work (result of recent inspection) and minimum work required, would be as follows: (but not necessarily limited to these items:)

1. DAM #1

a) remove trees
b) protect upstream slope from erosion
c) furnish us with plans or specifications on dam and drawdown structure

2. DAM #2

a) Remove trees
b) rebuild upstream wing walls and replace fill
c) repair downstream wall at east end of dam
d) level the top of the masonry
e) furnish us with plans, specifications, etc.

June 4, 1969(Continued)

May wish to consider current flood study (Blair's) on Cove River and their recommendations, if any, on modifications to dam(s). Submit plans prepared by engineer by August 8, 1969. Reply at earliest convenience.

June 10, 1969 - letter from Bruce E. Sweeney, Majority Leader, City Council, City of West Haven.

a) lake is overgrown with weeds and algae
b) "There are dams at both ends of the lake that are structurally unsound.
c) inquiring if state or federal aid available?

June 11, 1969 - letter from Water Resources Commission to Honorable John D. Prete. In answer to his phone call of May 6 - (see WRC memo to file dated May 7, 1969) - Discussion of flooding problem downstream from spillway and safety of the dams, referring to our letter of June 4, 1969 to Mr. Schroeder (the Association) as to repairs that were necessary.

June 13, 1969 - letter from Mr. Schroeder to WRC
"...We have been trying for over a year to engage the Blair Associates of New Haven to inspect the dams, and to submit plans for a permit to repair them." For one reason or another, they have not submitted plans or specifications.

1. DAM #1

a) It is matter of judgement that trees have adverse effect
b) Because no power boats on lake, ther is no wave action
c) We purchased Lake Phipps and its dams in 1957 and have no plans or specifications
d) We understand draw-down pipe has been permanently fastened,- no plans thereof.

2. DAM #2

a) As this dam is a gravity structure [not true] we feel that tree roots have little effect on its safety
b) We have not made repairs to wing-walls because you warned us not to proceed without plans.
c) Embankment upstream of east wing wall has not washed out

June 13, 1969 (Continued)

"The alterations you specify apparently are too small for any 'professional' in this area to undertake. We have contacted the Blakeslee Company, Blair Associates and others, for assistance with this problem, with no results. Without your assistance, we see no way to meet your August 8th deadline."

This is a small corporation whose stock holders are residents of the lake community. The corporation has no powers of assessment, and therefore has no means of income.

Is there any State or Federal aid?

June 19, 1969 - letter from Water Resources Commission to Bruce E. Sweeney
algae comments answered separately; no information in this office that dams are structurally unsound; We know of no other State or Federal Aid

June 30, 1969 - letter from Water Resources Commission to Herbert Schroeder
If you make firm request to Blair Associates, we feel they would undertake the job. We do not feel that adverse effect of trees is matter of judgement - some quotes from texts. Wave protection of embankment is not to protect against boats.

DAM #2

Your opinion concerning these trees may be considered upon supporting evidence from your engineer.
Our engineer's report says part of this embankment was washed out. Request comment from your engineer.
Masonry should be leveled to avoid concentration of overflow (if spillway capacity exceeded). Suggest contacting Blair Associates again, if no progress, let us know.
Not aware of State or Federal Aid - Please keep us informed of progress.

July 3, 1969 - copy of letter from Michael Rossetti, State Health Department to Nicholas Milano, M.D., Director of Health, West Haven
Summary of inspection on May 22, 1969 (see our memo to file dated June 4, 1969.

NTERDEPARTMENT MESSAGE

TO-201 12-69

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Use carbon if you really need a copy. If typewritten, ignore faint lines.

O	AGENCY	DATE
ROM	AGENCY	TELEPHONE

UBJECT

March 4, 1970 - memo to file from William H. O'Brien III summarizing Clarence Blair's report dated June, 1969 entitled "Flood Control Report Cove River" - (received January, 1970±)

1. DAM #1

Report proposes that a new spillway be built to the southwest of this dam to handle the run-off. This proposal does not affe the repairs requested previously.

2. DAM #2

Report suggests that spillway length be shortened from 20 feet to 2 feet so that the discharge would match more closely the capacity of the 24 inch culvert pipe under West Main Street. This proposal does not necessarily affect the other repairs as previously requested but would have to be considered in any engineering plan.

April 13, 1970 - letter from Water Resources Commission to Mr. Schroeder
We are enclosing a copy of Clarence Blair's report (referred to above).
It appears that there is no conflict between these report recommendations and the work we have requested. Their recommendations could be done separately and they do not affect the safety of the dam.
Please review plans and advise when plans will be submitted.
Submit your engineer's comments on overflow at north end of lake.

February 17, 1971 - letter from Water Resources Commission to Mr. Schroeder
Please advise us at your earliest convenience as to your intentions in repairing dam.

W. H. O'Brien III

William H. O'Brien

WHOIII:mh

SAVE TIME: *If convenient, handwrite reply to sender on this same sheet.*

BUCK & BUCK

ENGINEERS

71 CAPITOL AVENUE, HARTFORD, CONNECTICUT 06106

JAMES A. THOMPSON
ROBINSON W. BUCK

Comm. 5713-57

February 14, 1972

Mr. William H. O'Brien III
Department of Environmental Protection
Water and Related Resources
State Office Building
Hartford, Connecticut 06115

Re: Upper Lake Phipps Dams

Dear Mr. O'Brien:

The following is our report on the inspection of the subject dam on February 10, 1972.

Dam Number 1, East End of Lake

a. Both sides of the embankment are covered with trees and brush. These should be removed.

b. The embankment on the pond side of the masonry cut-off wall near the outlet structure has either been eroded away or has subsided. Pictures of the area taken in 1966 show the embankment in this same area at the normal height. A determination as to the cause of this subsidence should be made by the owner's engineer and the embankment should be restored to its normal level.

c. There is water seeping from the base of the main dam approximately twenty feet from the toe of the slope. The area is very wet. There is a slight indication of flow. It does not appear dangerous but we recommend that it be checked periodically to determine if the rate of flow is increasing.

d. On the northwest portion of the main dam between the rock outcropping and the house there is a leak at the toe of the slope. This leak is approximately 3 gallons per minute. We also note a toppled tree in the area and the ground under the tree was obviously saturated. There is a second leak up the slope to the southeast from the previously mentioned leak. This leak has a barely noticeable flow and does not seem to be significant. These leaks should be investigated by the owner's engineer and a determination made on their severity.

NAU

Dam Number 2, Dam at south side of lake, principal spillway

a. A section of masonry from the east abutment has fallen away leaving other sections of the abutment in danger of immediate collapse.

b. The west abutment is out of plumb 9 inches in 5-1/2 feet.

c. The approach on the pond side to the east abutment should be filled and protected with rip-rap or more stone masonry.

We strongly recommend that orders be issued as soon as possible for the immediate repair of this dam.

Dam Number 3, adjacent to railroad tracks

This is small earth embankment through which outlet pipes had been placed. The purpose of these pipes was to divert some of the discharge of the lake from the main spillway. The installation of these pipes was done in a very slipshod manner. The embankment is not wide enough and the pipes are not long enough. We recommend that all trees and brush be removed from this embankment (one birch has already fallen over pulling a fair amount of earth with it). We also recommend that the embankment be enlarged on its downstream side by at least ten feet. Materials used in this construction should be a compacted free draining bankrun gravel with a topsoil and grass cover. The extension of the embankment should be the same height as the existing embankment with a 2 to 1 downstream side slope. Pipes through the embankment should be extended through the new embankment with the outlet rip-rapped with heavy stone to prevent the erosion of the embankment.

If you have any questions on this matter, please don't hesitate to call.

Sincerely yours,

BUCK & BUCK

James A. Thompson

James A. Thompson

CLARENCE BLAIR ASSOCIATES

Civil and Sanitary Engineers
Land Surveyors

P. O. Box 236 93 Whitney Avenue New Haven, Conn. 06502

Telephone (203) 777-7379

CLARENCE M. BLAIR (1904-1944)

JAMES C. BEACH
JOHN M. BREST
NICHOLAS PIPERAS, JR.
CHARLES E. AUGUR, JR.
ROBERT H. MANSFIELD
STANLEY R. GOLEBIEWSKI
THOMAS M. KEYES
MICHAEL H. HORBAL
ROGER C. BROWN (Consultant)
FRANK RAGAINI (Consultant)

April 18, 1972

Willaim A. DeLong, President
Lake Phipps Land Owners Association
785 Main Street
West Haven, Connecticut

Dear Sir:

Referring to letter and order of State of Connecticut, Department of Environmental Protection, dated February 17, 1972, we are submitting the following preliminary report.

There are no original or as built plans of these dams available to us at this time.

As to the above mentioned letter and order we are making the following comments and recommendations:

1. Dam #1

   a. Remove all trees on or within 20 feet of embankment. It is recommended that trees be cut off at ground level on the embankment only. Fill should be disturbed as little as possible.

   b. Submit engineer's report on the cause of the low spot in the embankment and restore to the same configeration as the remainder of the embankment. See Sketch "A" as to filling this area with rip rap. Inspect this area periodically to see if any movement occurs and keep record of any changes.

   c. Submit engineer's analysis of leak in Item 1c of finding and check periodically for increased rate of flow.

   This apparent leak was exposed when the Lower Lake Phipps water level was dropped. At this time there is no sure way to determine if this water comes through the dam, under the dam or from the surrounding area adjacent to the toe of the dam. It is our understanding that this area dries up during the dry season. Before anything more can be determined observations should be made, possibly by weir installation and periodic records kept of the results. A Lake level should be recorded at each inspection.

d. Submit engineer's analysis of the severity of leaks mentioned under item 1d of finding.

These leaks occur just below the apparent toe of the Dam and we make the same recommendations as in "c" above.

2. Dam #2

a. Remove all trees on or within 20 feet of the earth embankment.

Same recommendations as in 1a.

b., c., d., and e.

See Sketch "B"

3. Dam #3

a. Remove all trees growing on or within 20 feet of the earth embankment.

Same recommendations as in 1a.

b., and c.

Survey is incomplete at this time but proposed plan will follow shortly depending on the following:

There is a question as to ownership here and there is a possibility that this dam will be removed.

Very truly yours,

Nicholas Piperas, Jr.

NP/lm

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Land Surveyors

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THOMAS M. KEYES
MICHAEL H. HORBAL
ROGER C. BROWN (Consultant)
FRANK RAGAINI (Consultant)

May 19, 1972

Mr. William H. O'Brien III
Environmental Protection Agency
State Office Building
Hartford, Connecticut 06115

Re: Dam #3
Upper Lake Phipps
West Haven, Conn.

Dear Mr. O'Brien:

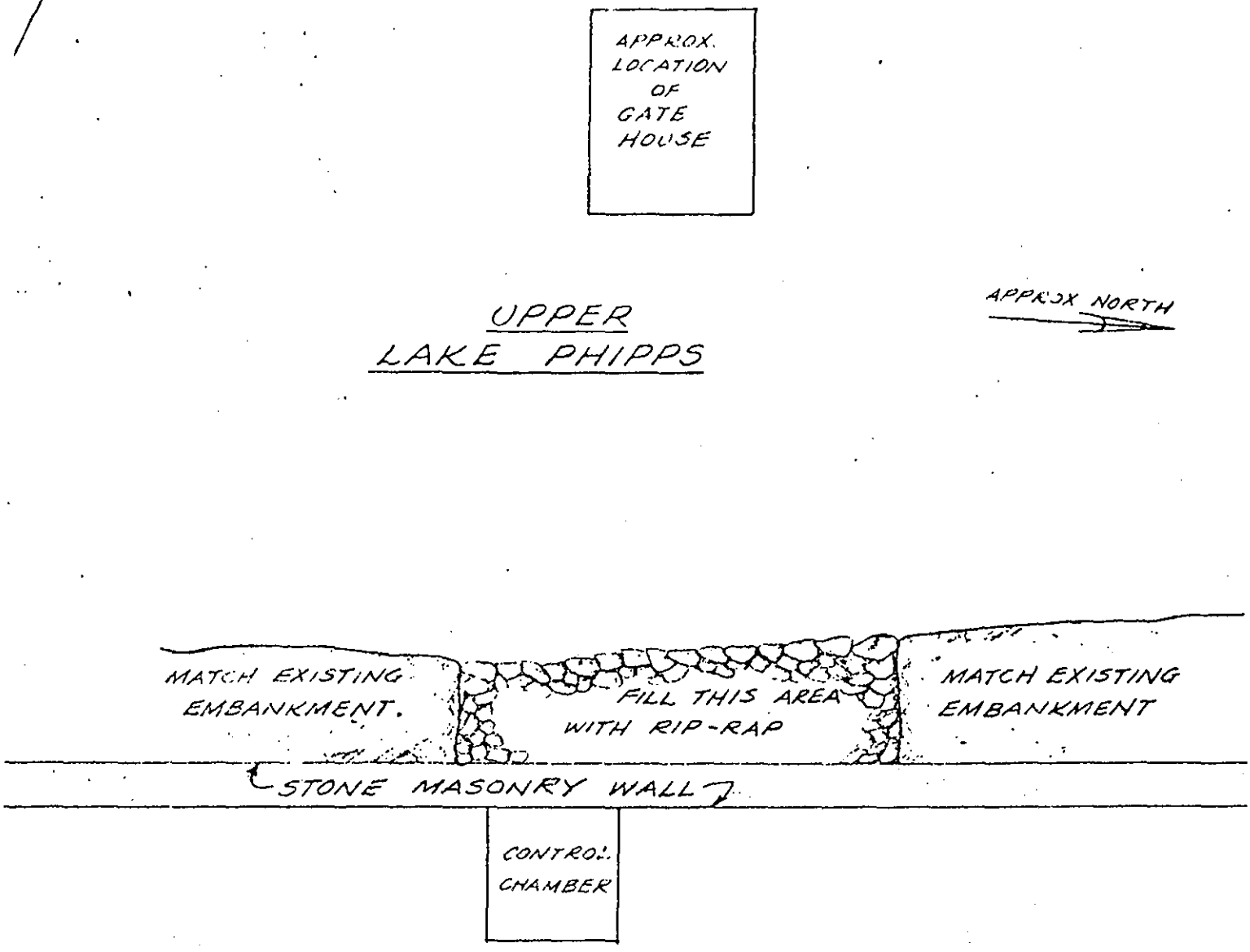
It is my understanding, after talking to Mr. William DeLong, President of the Lake Phipps Land Owners Association, that Dam #3 will be removed as it would be too costly to repair and improve.

Enclosed are the sealed prints that you requested.

Very truly yours,

Nicholas Piperas, Jr.

NP/lm
encl: Dam #1 3 prints
Dam #2 3 prints



SCALE 1"=10'

DAM #1

PLAN

SKETCH "A"

859:118

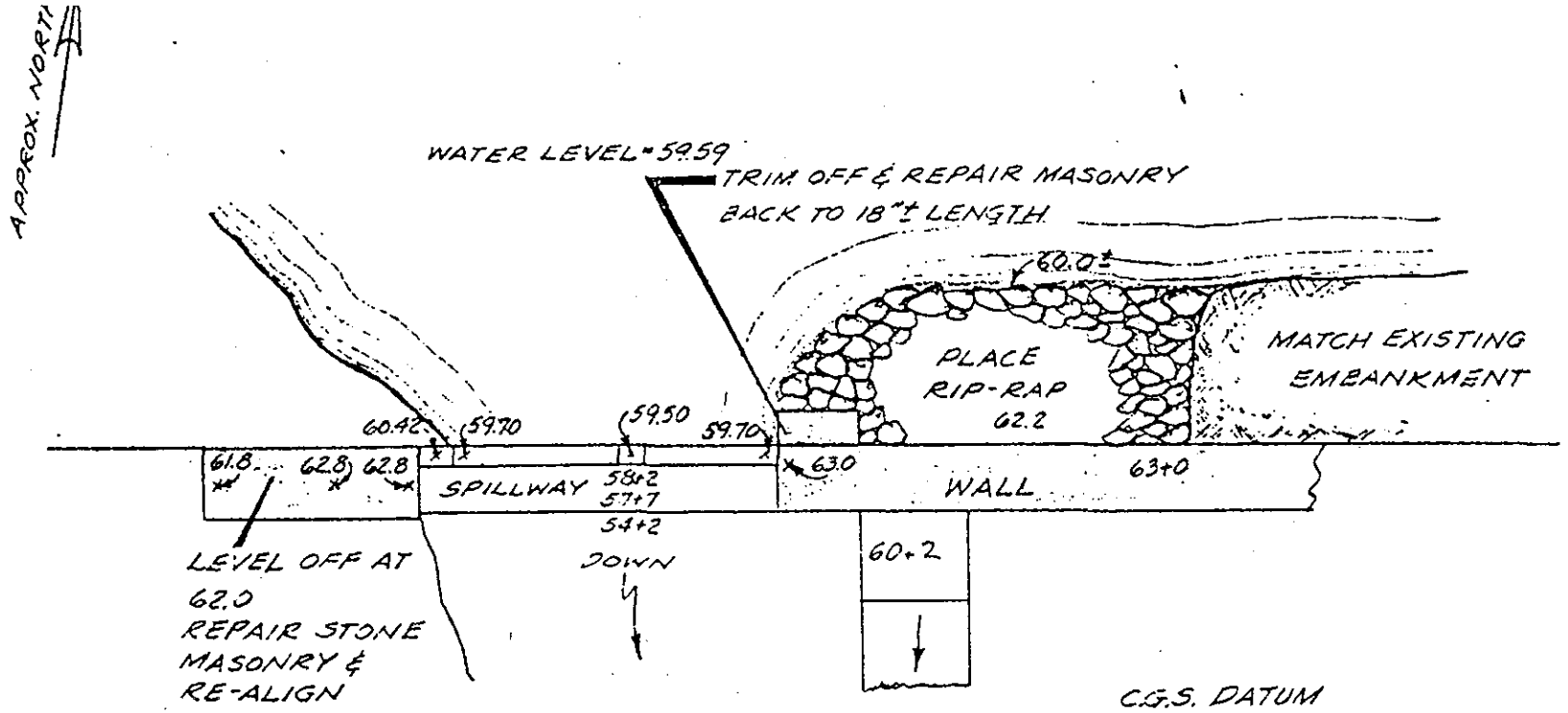
PRELIMINARY

UPPER LAKE PHIPPS

WEST HAVEN, CONN.

SCALE 1"=10' APRIL, 1972

CLARENCE BLAIR ASSOCIATES
CIVIL & SANITARY ENGINEERS
913 WHITNEY AVENUE NEW HAVEN, CONN.



PLAN

SKETCH "B"

DAM #2

853:114

B-28

PRELIMINARY

UPPER LAKE PHIPPS

WEST HAVEN, CONN.

SCALE 1"=10' APRIL, 1972

CLARENCE BLAIR ASSOCIATES

CIVIL & SANITARY ENGINEERS

[illegible]TNEY AVENUE NEW HAVEN, CONN.

Nicholas Piperas Jr.

STATE OF CONNECTICUT

DEPARTMENT OF ENVIRONMENTAL PROTECTION

STATE OFFICE BUILDING HARTFORD, CONNECTICUT 06115

WATER RESOURCES

CONSTRUCTION PERMIT FOR DAM

AUG 1 6 1972

Lake Phipps Land Owners Corp.
c/o Mr. William A. DeLong, President
West Haven, Connecticut

TOWN: West Haven
RIVER: Cove River
TRIBUTARY: unnamed

Gentlemen:

Your application for a permit to (repair) / (~~construct~~) a dam on an unnamed tributary of the Cove River in the Town of West Haven in accordance with plans prepared by Clarence Blair Associates dated June 15, 1972 has been reviewed.

The construction, in accordance with those plans, is APPROVED under the conditions which follow.

I. The Commissioner shall be notified as follows:
   a) ~~When construction has started.~~
   b) When construction has been completed and dam is ready for final inspection.

II. This permit with the plans and specifications must be kept at the site of the work and made available to the Commissioner at any time during the construction.

III. If any changes are contemplated or required, the Commissioner must be notified and supplementary approval obtained.

IV. If the construction authorized by this permit is not started within ~~one year~~ 3 months of the date of this permit and completed within _____ of the date, this permit must be renewed.

V. Additional requirements -

Your attention is directed to Section 132 of Public Act No. 872 which states in part regarding this Construction Permit: "A copy of the permit shall be sent to the town clerk." The enclosed carbon copy of this permit is the copy intended for the town clerk and it is your obligation to duly file this copy.

Your attention is further directed to Section 135 of Public Act No. 872: "Nothing in this chapter and no order, approval or advice of the Commissioner, shall relieve any owner or operator of such a structure from his legal duties, obligations and liabilities resulting from such ownership or operation. No action for damages sustained through the partial or total failure of any structure or its maintenance shall be brought or maintained against the state, the Commissioner of Environmental Protection, or his employees or agents, by reason of supervision of such structure exercised by the Commissioner under this chapter."

The Commissioner cannot convey or waive any property right in any lands of the State, nor is this permit to be construed as giving any property rights in real estate or material or any exclusive privileges, nor does it authorize any injury to private property or the invasion of private rights or any infringement of federal, state or local laws or regulations.

Your attention is also directed to Section 309 of Public Act No. 872: "No person shall, unless authorized by the commissioner, prevent the passing of fish in any stream or through the outlet or inlet of any pond or stream by means of any rack, screen, weir or other obstruction or fail, within ten days after service upon him of a copy of an order issued by the commissioner, to remove such obstruction."

At your service,

DEPARTMENT OF ENVIRONMENTAL PROTECTION

Dan W. Lufkin, Commissioner

DWL:WHO:ljg

17 May 1973

Lake Phipps Land Owners Corporation
c/o Mr. Phillip S. Jewett
145 Phipps Drive
West Haven, Connecticut 06516

Re: Upper Lake Phipps
West Haven

Gentlemen:

During a recent inspection of the dams on Lake Phipps it was noted that several of the items of the Department of Environmental Protection's ORDER issued on 17 February 1972 have not been complied with. The deficiencies noted were:

1. Dam #1, East End of Lake

   a. The section of the upstream near the center of the dam has either eroded away or subsided.

2. Dam #2, South Spillway

   a. The west abutment is out of plumb 9 inches in 5½ feet. This was to be repaired.

3. Dam #3, Adjacent to Railroad Tracks

   a. There are many trees growing on this dike.

   b. The dimensions of the cross section of the embankment do not provide an adequate factor of safety.

The following action was directed by the above mentioned ORDER but has not been complied with:

1. Dam #1, East End of Lake

   a. Submit engineer's report on the cause of the low spot in the embankment and restore to the same configuration as the remainder of the embankment.

2. Dam #2, South Spillway

   a. The upstream rip-rap on the east abutment was not placed.

   b. The west abutment has not been corrected.

3. Dam #3, Adjacent to Railroad Track

   a. Remove all trees growing on or within 20 feet of the earth embankment.

   b. Enlarge dam on its downstream side by at least 10 feet.

   c. Extend pipes through new embankment and provide erosion protection at the outlet end.

   d. Dress up the embankment with a minimum 2 to 1 downstream slope, level top, and loam and seed embankment.

You should note that the permit issued on 16 August 1972 to cover this work will expire this August.

It appears that the construction of the new sewer line below Dam #1 at the east end of the lake has affected the outlet pipe through the dam. You are requested to submit plans for the sewer line, as it affects the dam discharge line, to this office. A copy of these drawings should also be in your file.

The construction of the sewer line has left a rather unsightly mess and mosquito breeding area at the toe of Dam #1, which your association may want the sewer agency to clean up.

This department should be notified within two weeks as to what steps you plan to take to finish complying with the Order issued 17 February 1972.

Very truly yours,

Morgan S. Ely
Senior Civil Engineer
Water and Related Resources

MSE:n

erdepartment Message

:01 REV.3/74 STATE OF CONNECTICUT
k No. 6938-051-01)

SAVE TIME: *Handwritten messages are acceptable.*
Use carbon if you really need a copy. If typewritten, ignore faint lines.

	NAME	TITLE	DATE
o	Victor F. Galgowski	Supt. of Dam Maintenance	22 November 1976
	AGENCY	ADDRESS	
	Water Resources Unit		
	NAME	TITLE	TELEPHONE
m	Charles J. Pelletier	Consultant	
	AGENCY	ADDRESS	
	Environmental Protection		

:CT

Lake Phipps Dam - West Haven

This dam was inspected on October 28, 1976. Some repairs had been made to the masonry at the left end of the overflow spillway. However, the masonry continues to be in poor condition in the area of the spillway. There is also some seepage at two locations to the left of the spillway and at a low elevation on the downstream masonry wall. The earth embankment on the upstream side of the masonry wall has been eroded by wave and ice action so that the top width has been significantly reduced. There are also trees growing on this embankment which should be removed. The embankment should be restored. The spillway training walls should be replaced and the masonry repaired.

The dam which forms the east end of the lake is earth and rock fill with a masonry core wall. There are many large trees growing on the embankment. They should be removed.

The earth at the top of the easterly dam in the vicinity of the gate structure has been eroded or worn down by foot traffic and should be restored.

There has been fill placed along the downstream toe of this dam which partially obscures the seepage which was observed on previous occasions.

There is a high potential for property damage and loss of life in the event that either of these dams were to fail.

Both the dam at the spillway and the dam at the east end of the pond, require repair to insure their safety.

C. J. Pelletier
Water Resources Unit

CJP:ljk

SAVE TIME: *If convenient, handwrite reply to sender on this same sheet.*

COPY

STATE OF CONNECTICUT

DEPARTMENT OF ENVIRONMENTAL PROTECTION

STATE OFFICE BUILDING HARTFORD, CONNECTICUT 06115

17 January 1978

Hon. Carl R. Ajello
Attorney General
30 Trinity Street
Hartford, Connecticut

Re: Upper Lake Phipps Dam
West Haven

Dear Mr. Ajello:

Under the provisions of Section 26-116 of the General Statutes, I hereby request that you take immediate legal steps to effect the repair or removal of the referenced dam according to the Order issued February 17, 1972, by the Department of Environmental Protection.

Enclosed please find all the correspondence in our files pertaining to this matter.

Sincerely yours,

Stanley J. Pac
Commissioner

SJP:ljk

Enclosure

Supervision of Dams
Water Resources Unit
Telephone no. 566-7245

COPY

STATE OF CONNECTICUT

DEPARTMENT OF ENVIRONMENTAL PROTECTION

STATE OFFICE BUILDING HARTFORD, CONNECTICUT 06115

4 May 1978

NOT SENT DIRECTLY — GIVEN TO RICK W. — HE SENT INFO.

John H. Peck, Esq.
Reilly, Peck, Raffile & Lasala
P.O. Box No. 1820, 33 Whitney Ave.
New Haven, Connecticut 06508

Re: Upper Lake Phipps
West Haven

Dear Mr. Peck:

Pursuant to your recent request for Motion For Disclosure And Production pertaining to the subject dam, please be advised the findings listed in the Order of February 17, 1972 are still valid.

The specific repairs or alterations to Dam No. 1 to satisfy the Statutes are:

1. Remove all trees on or within 20 feet of the embankment.
2. Submit engineer's report on the cause of the low spot in the embankment and restore configuration of embankment.
3. Submit engineering analysis of various leaks.
4. Any other repairs or action found necessary by the owner's engineer.

The specific repairs or alterations to Dam No. 2 to satisfy the Statutes are:

1. Remove all trees on or within 20 feet of the embankment.
2. Repair spillway, abutments and training wall.
3. Provide adequate cross section east of spillway.
4. Any other repairs or action found necessary by the owner's engineer.

The specific repairs or alterations to Dam No. 3 to satisfy the Statutes are:

1. Remove all trees growing on or within 20 feet of the earth embankment.

2. Enlarge dam on its downstream side by at least ten feet, provide at least a 2 to 1 slope and seed.

3. Extend pipes through embankment and provide erosion protection at outlet.

4. Any other repairs or action found necessary by the owner's engineer.

The date of the latest inspection of this site was April 28, 1978.

I am enclosing copies of all pertinent reports and correspondence pertaining to this site since February 1972, with the exception of engineering plans.

Very truly yours,

Victor F. Galgowski
Supt. of Dam Maintenance
Water Resources Unit
Telephone no. 566-7245

VFG:ljk

Enclosures

cc: Richard Webb

BUCK & BUCK

ENGINEERS

98 WADSWORTH STREET, HARTFORD, CONNECTICUT 06106

JAMES A. THOMPSON
ROBINSON W. BUCK
LAWRENCE F. BUCK

HENRY WOLCOTT BUCK
1931-1965
ROBINSON D. BUCK
1935-1959

COMM. 5713-57

January 15, 1980

Mr. Victor Galgowski
Superintendent of Dams
Department of Environmental Protection
State Office Building, Capitol Avenue
Hartford, Connecticut, 06115

Reference: Upper Lake Phipps Dam
West Haven

Dear Vic:

The following is a report of our inspection of the subject dam on October 30, 1979.

1. Dam #2 (South Spillway)

Concrete has been placed along the upstream side of the east abutment, but it is not in accordance with the approved plan, nor is it satisfactory.

The westerly abutment wall is in poor condition and still out of plumb. It should be rebuilt.

The spillway section has been capped with concrete, to an unknown eleyation. The owners engineer should confirm on an as-built drawing that the top of the new spillway is as specified on the approved plans.

Removal of trees and brush on top of the dam has not been completed and the trees and brush that haye been removed were deposited at the base of the dam, making it impossible to inspect for leaks. Removal of trees and brush, both cut and standing, must be completed.

2. Dam #1 (East End of Lake)

Fill has not been placed on the top center of the dam as recommended by the owner's engineers. The Dam is not in compliance with the D.E.P. order of February 17, 1972.

3. Dam #3 (Adjacent to Railroad Tracks)

Dam is not in compliance with the D.E.P. order of February 17, 1972.

Sincerely yours,
BUCK & BUCK

James A. Thompson

JAT/sm

BUCK & BUCK

ENGINEERS

98 WADSWORTH STREET, HARTFORD, CONNECTICUT 06106

JAMES A. THOMPSON
ROBINSON W. BUCK
LAWRENCE F. BUCK

HENRY WOLCOTT BUCK
1931-1965
ROBINSON D. BUCK
1935-1959

COMM. 5713-57

January 15, 1980

Mr. Victor Galgowski
Superintendent of Dams
Department of Environmental Protection
State Office Building, Capitol Avenue
Hartford, Connecticut, 06115

Reference: Upper Lake Phipps Dams
West Haven

Dear Vic:

After our inspection of the subject dam on October 30, 1979, we made a hydrologic analysis of the Dam and Lake, taking into account the relatively large lake area with respect to the total watershed. The computations indicate that for 2 hr., 3 hr., 6 hr., 12 hr., and 24 hr., 100 year storms, the maximum high water level occurs at the 6 hr., and 12 hr., storms and the freeboard remaining at high water is 2.05 feet. The computations also indicate that the dam will be slightly overtopped by a 6 hour, 50% maximum probable flood if one neglects possible discharges at dam #3. However, I strongly suspect that overtopping may not occur at Dam No. 2, because of the low flat grades in the area of Dam No. 3. According to the limited topography that I have, the ground surface in the vicinity of Dam #3 is approximately elevation 62±, while the top of Dam #1 is Eleyation 63. Thus, the area near Dam #3 will start to act as an outlet long before overtopping at Dam #1, but we can not determine the exact amount of discharge at Dam #3.

The conclusion of our analysis is that the main spillway at Dam #2 has sufficient hydraulic capacity for all 100 year floods and, depending upon the amount of discharge at Dam #3, it may also be able to pass a 1/2 maximum probable flood. Dam No. 3 has the least free board of the 3 dams and for a 100 year, 6 hour storm, the free board will be 0.95 feet. This dam also has a skimpy cross section that could not withstand the erosive action of a near or minor overtopping. Therefore, in my opinion, the two items of the Department of Environmental Protection order of February 17, 1972, pertaining to Dam No. 3 should be enforced.

Sincerely yours,
BUCK & BUCK

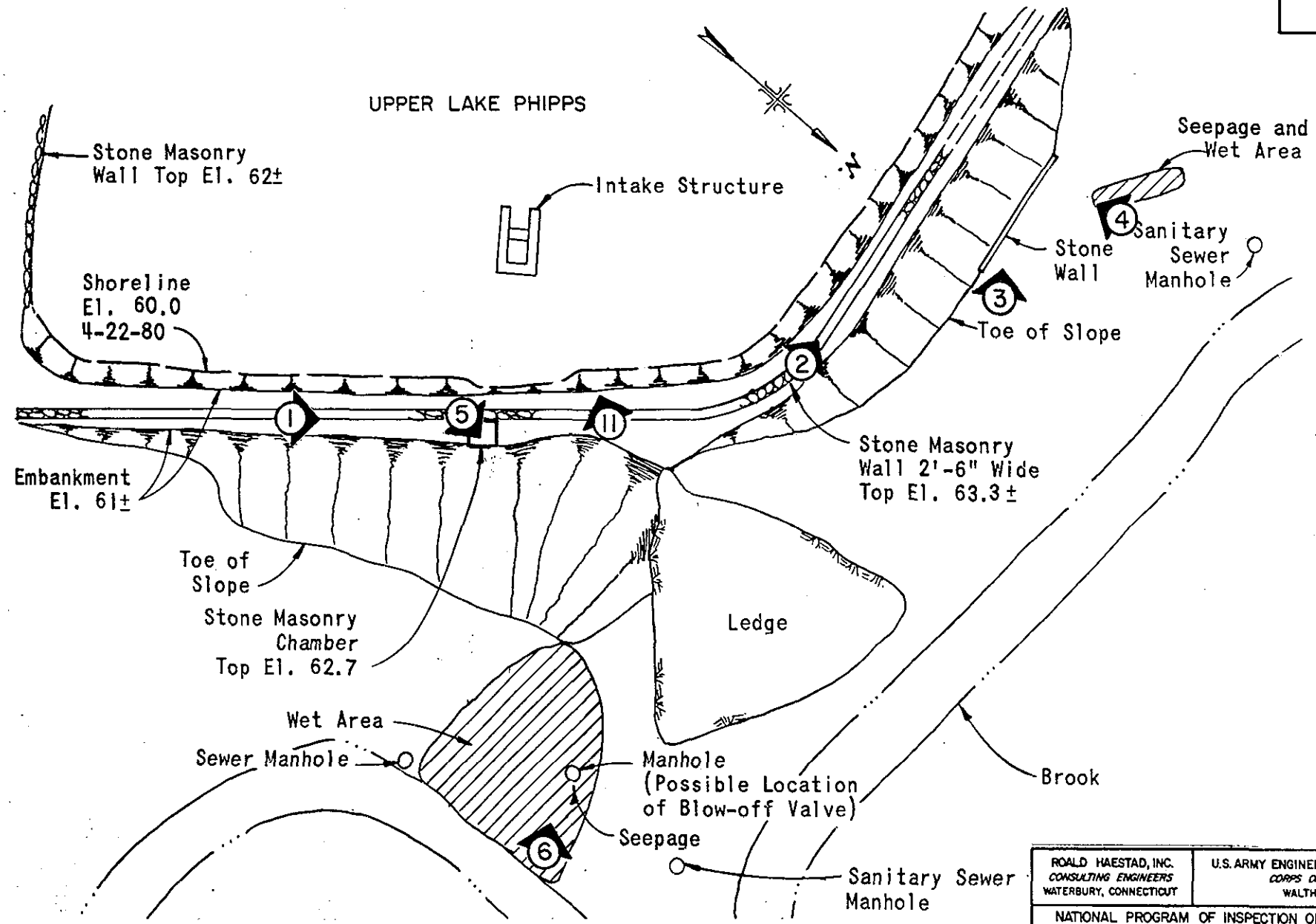
James A. Thompson

JAT/sm

APPENDIX C

PHOTOGRAPHS

FIGURE 3A



DENOTES PHOTO NUMBER AND DIRECTION IN WHICH PHOTO WAS TAKEN

ROALD HAESTAD, INC. CONSULTING ENGINEERS WATERBURY, CONNECTICUT	U.S. ARMY ENGINEER DIV. NEW ENGLAND CORPS OF ENGINEERS WALTHAM, MASS.

NATIONAL PROGRAM OF INSPECTION OF NON-FED. DAMS

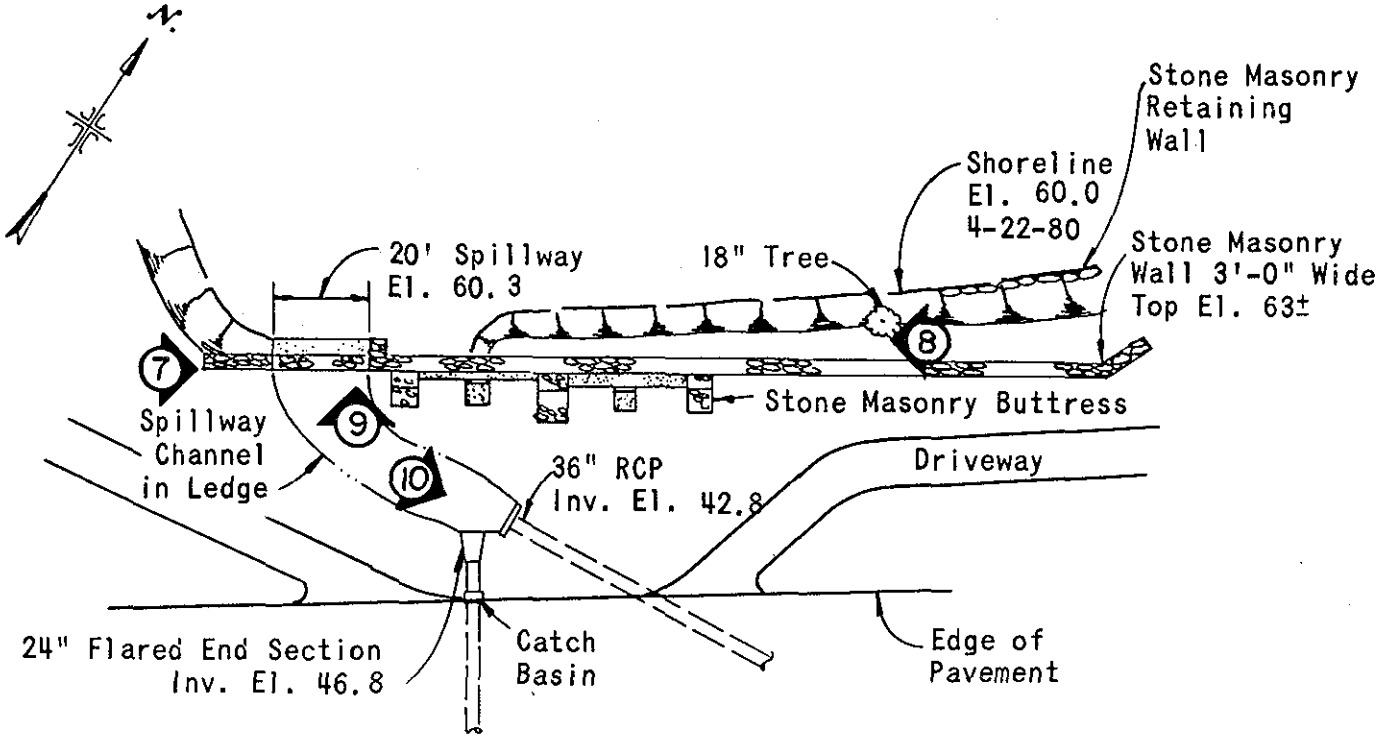
PHOTO LOCATION PLAN

UPPER LAKE PHIPPS DAM NO. 1

WEST HAVEN, CONNECTICUT

DRAWN	CHECKED	APPROVED	SCALES 1" = 40'
JRS	RGL	RH	DATE JULY 1980 PAGE C-1

FIGURE 3B



DENOTES PHOTO NUMBER
AND DIRECTION IN WHICH
PHOTO WAS TAKEN

PHOTO LOCATION PLAN

UPPER LAKE PHIPPS DAM NO. 2
WEST HAVEN, CONNECTICUT

SCALE: 1" = 40'

ROALD HAESTAD, INC.

JULY 1980

PHOTO NO. 1

RIGHT SECTION OF DAM NO. 1
NOTE GATE CHAMBER DOWNSTREAM
AND EROSION UPSTREAM OF MASONRY WALL

PHOTO NO. 2*

LEFT SECTION OF DAM NO. 1
NOTE BRUSH AND TREE GROWTH
ON CREST AND SLOPES

*5 APRIL '80

U.S.ARMY ENGINEER DIV. NEW ENGLAND CORPS OF ENGINEERS WALTHAM, MASSACHUSETTS	NATIONAL PROGRAM OF INSPECTION OF NON-FED. DAMS	UPPER LAKE PHIPPS DAM NO.1 TR. TO COVE RIVER WEST HAVEN, CONNECTICUT CT 00109 6 MAY '80
ROALD HAESTAD, INC. CONSULTING ENGINEERS WATERBURY, CONNECTICUT		

PHOTO NO. 3

STONE WALL ON DOWNSTREAM
SLOPE OF DAM NO. 1 NEAR
LEFT ABUTMENT

PHOTO NO. 4

SEEPAGE FROM
BASE OF SAPLING

U.S.ARMY ENGINEER DIV. NEW ENGLAND CORPS OF ENGINEERS WALTHAM, MASSACHUSETTS	NATIONAL PROGRAM OF INSPECTION OF NON-FED. DAMS	UPPER LAKE PHIPPS DAM NO. 1 TR. TO COVE RIVER WEST HAVEN, CONNECTICUT CT 00109 6 MAY '80
ROALD HAESTAD, INC. CONSULTING ENGINEERS WATERBURY, CONNECTICUT		

PHOTO NO. 5

SEEPAGE AREA AT DOWNSTREAM TOE
OF RIGHT SECTION OF DAM NO. 1

PHOTO NO. 6

SEEPAGE AREA DOWNSTREAM OF MANHOLE
(POSSIBLE LOCATION OF BLOWOFF VALVE)

U.S.ARMY ENGINEER DIV. NEW ENGLAND CORPS OF ENGINEERS WALTHAM, MASSACHUSETTS	NATIONAL PROGRAM OF INSPECTION OF NON-FED. DAMS	UPPER LAKE PHIPPS DAM NO. 1 TR. TO COVE RIVER WEST HAVEN, CONNECTICUT CT 00109 6 MAY '80
ROALD HAESTAD, INC. CONSULTING ENGINEERS WATERBURY, CONNECTICUT		

PHOTO NO. 7

DAM NO. 2 FROM RIGHT ABUTMENT,
SPILLWAY IN FOREGROUND

PHOTO NO. 8

DAM NO. 2 FROM LEFT ABUTMENT.
NOTE TREES AND BRUSH ON UPSTREAM SLOPE

U.S.ARMY ENGINEER DIV. NEW ENGLAND CORPS OF ENGINEERS WALTHAM, MASSACHUSETTS	NATIONAL PROGRAM OF INSPECTION OF NON-FED. DAMS	UPPER LAKE PHIPPS DAM NO. 2 TR. TO COVE RIVER WEST HAVEN, CONNECTICUT CT 00110 6 MAY '80
ROALD HAESTAD, INC. CONSULTING ENGINEERS WATERBURY, CONNECTICUT		

PHOTO NO. 9

MASONRY WALL TO LEFT OF SPILLWAY,
NOTE APPARENT DISPLACEMENT

PHOTO NO. 10

30-INCH AND 24-INCH CULVERTS
UNDER ROADWAY DOWNSTREAM OF SPILLWAY
NOTE GRATE ON 30-INCH CULVERT

U.S.ARMY ENGINEER DIV. NEW ENGLAND CORPS OF ENGINEERS WALTHAM, MASSACHUSETTS	NATIONAL PROGRAM OF INSPECTION OF NON-FED. DAMS	UPPER LAKE PHIPPS DAM NO. 2 TR. TO COVE RIVER WEST HAVEN, CONNECTICUT CT 00110 6 MAY '80
ROALD HAESTAD, INC. CONSULTING ENGINEERS WATERBURY, CONNECTICUT		

PHOTO NO. 11

REMAINS OF INTAKE STRUCTURE
UPSTREAM OF DAM NO. 1

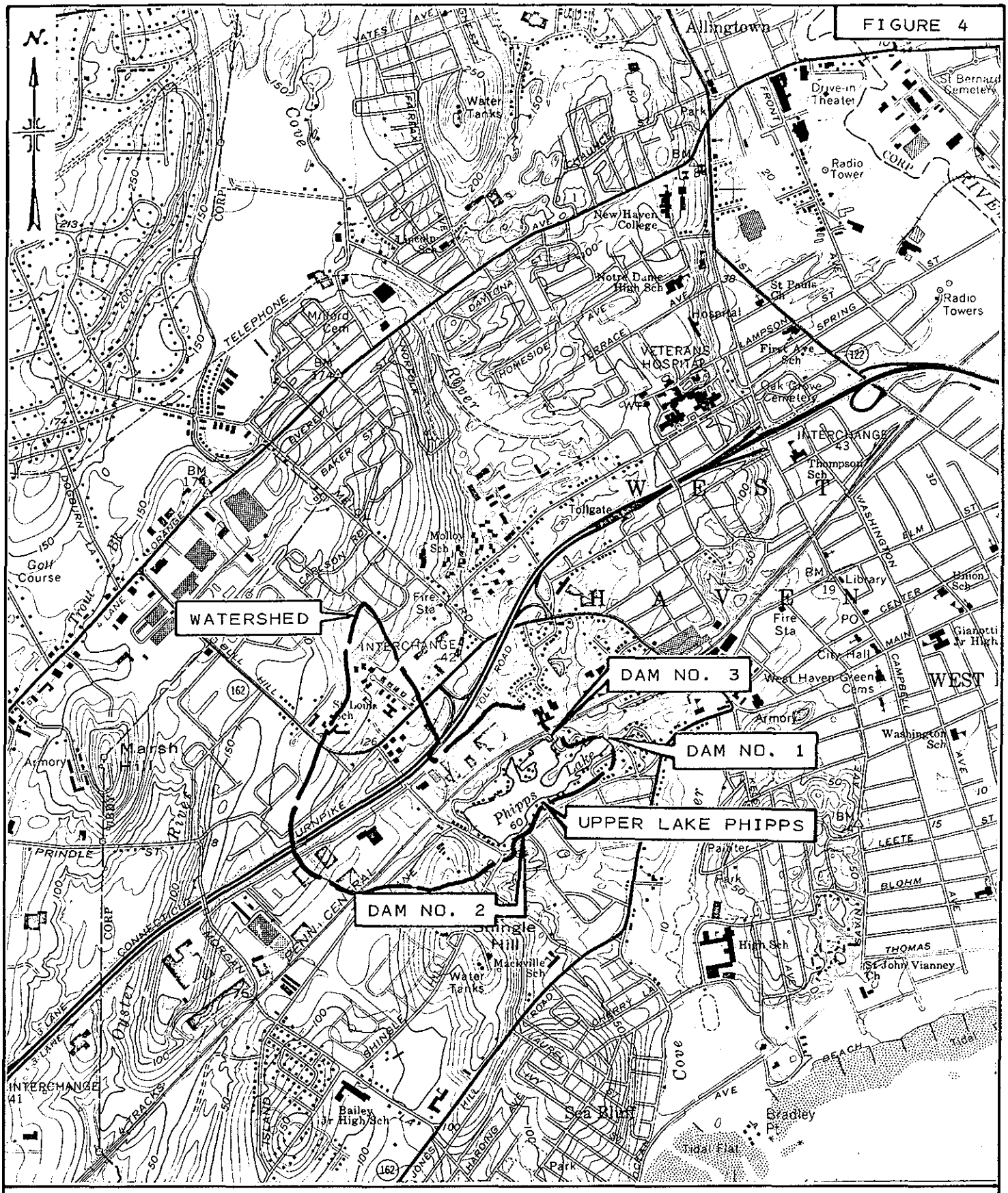
PHOTO NO. 12

CULVERTS AT CAUSEWAY

APPENDIX D

HYDROLOGIC AND HYDRAULIC COMPUTATIONS

FIGURE 4



WATERSHED MAP

UPPER LAKE PHIPPS DAM NOS. 1, 2 & 3
WEST HAVEN, CONNECTICUT

SCALE: 1" = 2000'

ROALD HAESTAD, INC. NEW HAVEN QUADRANGLE 1972

CULVERTS DAM NO. 3

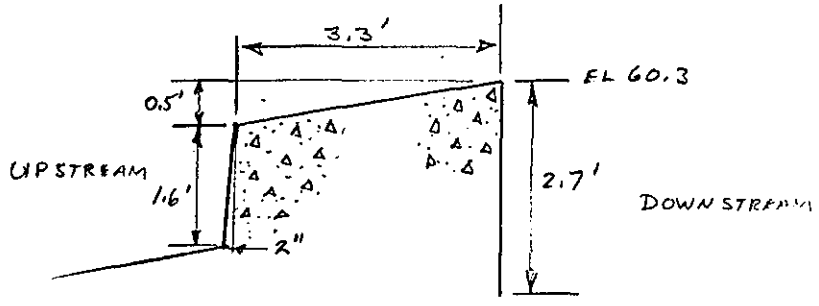
2 - 15" ACCMP INV. 59.8 , Projecting

TOP OF EMBANKMENT EL 63.0

CAPACITY HEC-5, CHART 5 = 16 CFS

SPILLWAY DAM NO. 2

LENGTH = 20'
ELEV. = 60.3
TOP OF DAM = 63.0
COEF. = 3.3



SPILLWAY SECTION

SPILLWAY CAPACITY $Q = CLH^{3/2}$

$Q = 3.3\,(20)\,(2.7)^{3/2}$

$Q = 293$ CFS

TOTAL SPILLWAY CAPACITY EL 63.0

$Q_T = 293$ CFS + 16 CFS = 309 CFS

SUBJECT UPPER LAKE PHIPPS DAM - SPILLWAY CAPACITY

			DAMS			
ELEV.	CULVERTS	SPILLWAY	NO.1	NO. 2	NO. 3	TOTAL
59.8	0	—	—	—	—	0
60.3	2	0	—	—	—	2
61.0	7	39	—	—	—	46
62.0	12	146	—	—	—	158
63.0	16	293	—	0	0	309
63.3	17	343	0	84	41	485
63.5	18	378	91	180	88	755

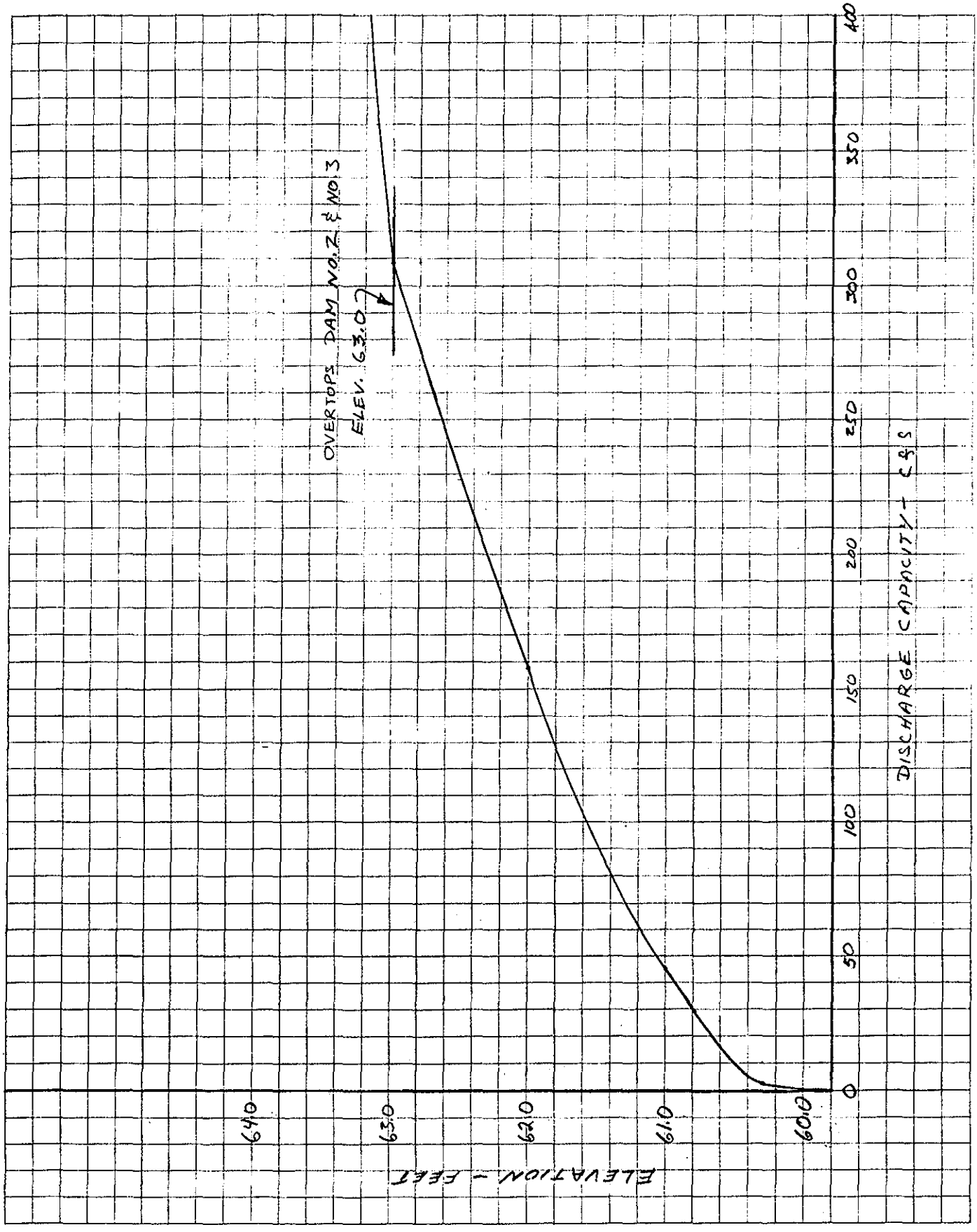
	ELEV.	LENGTH	COEF.
SPILLWAY	60.3	20'	3.3
DAM NO.1	63.3	340'	3.0
DAM NO.2	63.0	170'	3.0
DAM NO.3	63.0	100'	2.5

BY DLS DATE 4/22/80 **ROALD HAESTAD, INC.** SHEET NO 3 OF 16

CONSULTING ENGINEERS

CKD BY SAL DATE 5/20/80 37 Brookside Road - Waterbury, Conn. 06708 JOB NO 042-19

SUBJECT UPPER LAKE PHIPPS DAM - SPILLWAY CAPACITY



SUBJECT UPPER LAKE PHIPPS DAM - TEST FLOOD - 1/2 PMF

HAZARD CLASSIFICATION - HIGH

SIZE CLASSIFICATION - SMALL

TEST FLOOD = 1/2 PMF TO PMF

USE 1/2 PMF Both height 29 ft. and storage 200 Ac-Ft. are on the low end of the requirements for a "Small" dam. Guidelines Table 1.

USING CORPS OF ENGINEER CHART FOR "Rolling" terrain" (No major streams enter lake. Inflow is through several seperate culverts)

MPF = 2125 cfs/sq. mi. (min. 2.0 sq. mi. area)

Watershed Area = 0.37 sq. mi.

PMF = 2125 x 0.37 = 786 cfs

1/2 PMF = 786/2 = 393 cfs INFLOW

Q_{p1} = 393 cfs

Surcharge height - H_1 = 3.4 feet.

Stor$_1$ = 3.4' x 24.5 Ac. = 83.3 Ac-Ft. /0.37x640 X12 = 4.2"

$Q_{p2} = Q_{p1}\left(1 - \frac{4.2}{9.5}\right)$ = 219 cfs

H_2 = 2.6' STOR$_2$ = 3.2"

$STOR_{AVE.} = \frac{4.2+3.2}{2}$ = 3.7"

$Q_{p3} = 393\left(1 - \frac{3.7}{9.5}\right)$ = 240 cfs OUTFLOW H_3 = 2.8'

SPILLWAY CAPACITY = 309 cfs = $^{309}/_{240}(100)$ = 129% TEST FLOOD

SUBJECT UPPER LAKE PHIPPS DAM - SIZE CLASSIFICATION

PLANIMETER NO. 60272

WATERSHED AREA

THIRD	85.88	2.60 in^2 = 238.75 Acres = 0.37 sq. mi.
FIRST	80.66	2.59
START	78.07	

WATER SURFACE AREA

THIRD	05.70	0.267 in^2 = 24.5 Acres
FIRST	05.16	0.26
START	04.90	

STORAGE CAPACITY

ESTIMATED AVERAGE DEPTH - 10 feet.

FREEBOARD HEIGHT - 3 feet

STORAGE CAPACITY = $10'(24.5\ Ac) + 3'(24.5\ Ac) = 318.5$ Ac-Ft.

USE S = 320 Ac-Ft.

HEIGHT

DAM NO. 2 = DAM AT SPILLWAY = 63.0 Crest - 49.2 Toe = 13.8 Feet

DAM NO. 1 = MAIN DAM = 63.3 CREST - 34.2 Toe = 29.1 Feet

HEIGHT = 29.0 Feet

SIZE CLASSIFICATION

BASED ON BOTH HEIGHT AND STORAGE CAPACITY SIZE IS "SMALL"

MAIN DAM DAM NO.1

DAM BREACH $Q_{p1} = 8/27\ W_b \sqrt{g}\ y_o^{3/2}$

W_b = DAM BREACH WIDTH = 40% of MID-HEIGTH OF DAM

$= (0.4)(100') = 40'$

y_o = Hydraulic Height of Dam - Toe to Maximum Water Level

$= 63.3 - 34.2 = 29.1'$ USE 29'

$Q_{p1} = 8/27\ (40)\sqrt{32.2}\ (29)^{3/2} = 10{,}503$ cfs

USE $Q_{p1} = 10{,}500$ cfs

DAM AT SPILLWAY DAM NO.2

$W_b = 130'(0.4) = 52'$

$y_o = 14'$

$Q_{p1} = 8/27\ (52)\sqrt{32.2}\ (14)^{3/2}$

$= 4580$ cfs

SECTION NO.1 A & B LOWER LAKE PHIPPS DAM (LLP)
(SEE FIGURE 5)

$Q_{p1} = 10,500$ cfs

$H_1 = 9.4'$ $V_1 = 45$ Ac-Ft.

$$Q_{p2\,(TRIAL)} = Q_{p1}\left(1 - \frac{V_1}{S}\right) = 10,500\left(1 - \frac{45}{320}\right)$$

$$= 9,023 \text{ cfs}$$

$H_{2\,(TRIAL)} = 8.8'$ $V_{2\,(TRIAL)} = 41$ Ac-Ft.

$$V_{AVE.} = \frac{45+41}{2} = 43 \text{ Ac-Ft.}$$

$$Q_{p2} = 10,500\left(1 - \frac{43}{320}\right) = 9089 \text{ cfs}$$

Flow Divides - Section 1A, Section 1B

14% South Spillway LLP = 1272 cfs (A)
86% Main Spillway LLP = 7817 cfs (B)

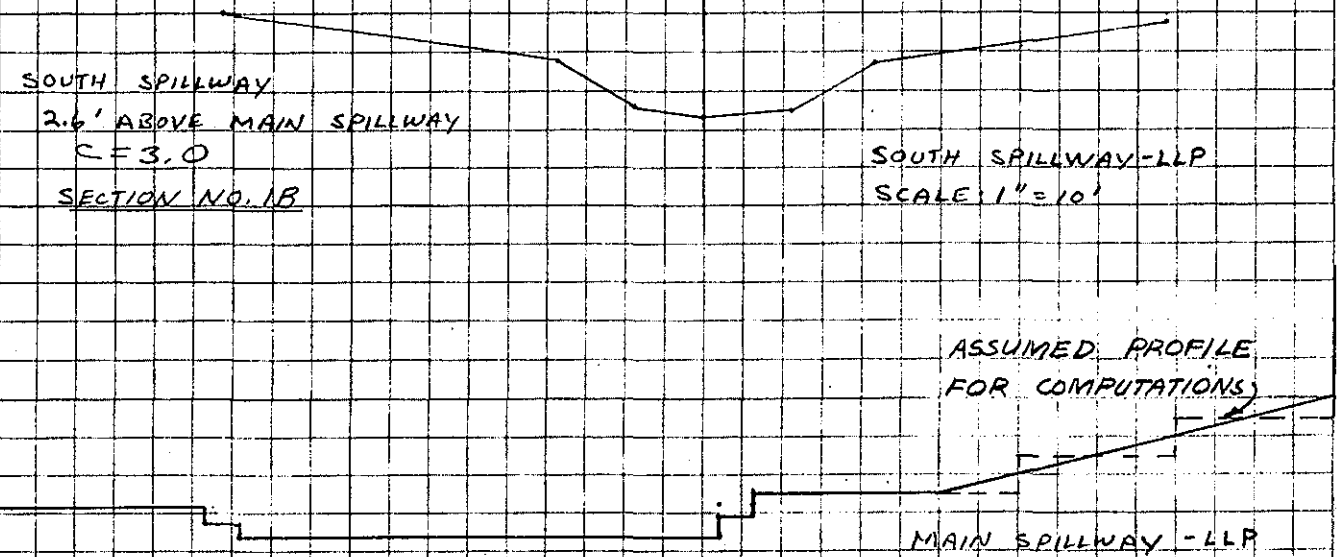
(A) The 1272 cfs discharge from the south spillway at Lower Lake Phipps would flow down the brook without affecting homes and would overtop Main Street (Rt. 162). The capacity of the 6'x5.5' box culvert at section 2A is 360 cfs. The flood would overtop the roadway by about 2 ft. Sills are 3.5' above the pavement. The flow discharged across Main Street at Section 2A would not flood the near by homes. The flood wave then dissipates in the tidal marsh.

(B) The 7817 cfs discharge from the main spillway at Lower Lake Phipps would flow through a school yard and inundate 3 commercial buildings and one home before overtopping Main Street (Rt. 162) by about 3-4 feet.

South of Main Street 15-20 more homes and 2 apartment buildings would be affected before the flood waters reach the tidal marsh.

SUBJECT UPPER LAKE PHIPPS DAM - FLOOD ROUTING MAIN DAM

SECTION NO. 1A LOWER LAKE PHIPPS (SEE FIGURE 5)



$Q = CLH^{3/2}$

H = HEIGHT ABOVE SPILLWAY (FT)

L = LENGTH (FT)

C = COEFFICIENT

$C_{spillway} = 3.3$

$C_{over\ dam} = 3.0$

H	Q MAIN	Q SOUTH	Q TOTAL (CFS)
2	497	0	497
4	1850	50	1,900
6	3960	300	4,260
8	6765	850	7,615
10	10,160	1750	11,910

SURFACE AREA LOWER LAKE PHIPPS

EL 291	THIRD	48.08	0.65 = 3.7 Acres
	FIRST	46.78	0.65
	START	46.13	
EL 30	THIRD	51.15	1.02' = 5.9 ACRES
	FIRST	49.09	1.01
	START	48.08	

BY SAL DATE 5/29/80 **ROALD HAESTAD, INC.** SHEET NO 9 OF 16

CONSULTING ENGINEERS

CKD BY DLS DATE 7/8/80 37 Brookside Road - Waterbury, Conn. 06708 JOB NO 49-019

SUBJECT UPPER LAKE PHIPPS DAM - Storage Capacity Section 1A & 1B

Elevation (ft)	Surface Area (Acres)	Average Surface Area (Acres)	Storage Capacity (Acre-ft)
20	3.70		0
		3.92	
22	4.14		7.8
		4.36	
24	4.58		16.6
		4.80	
26	5.02		26.2
		5.24	
28	5.46		36.6
		5.68	
30	5.90		48.0

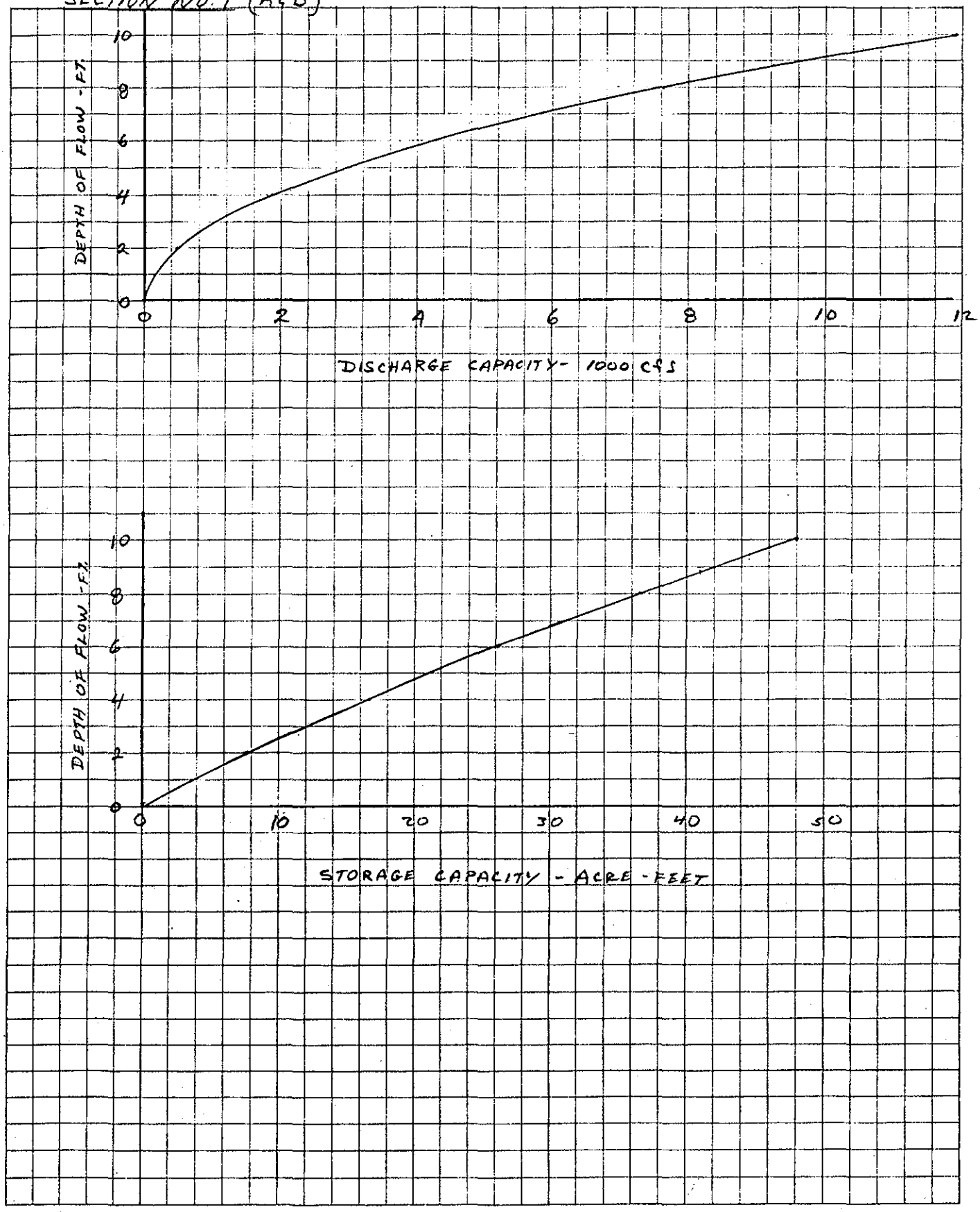
BY DLS DATE 4/30/80 **ROALD HAESTAD, INC.** SHEET NO 10 OF 16

CONSULTING ENGINEERS

CKD BY SAL DATE 5/20/80 37 Brookside Road - Waterbury, Conn. 06708 JOB NO 049-19

SUBJECT UPPER LAKE PHIPPS DAM — FLOOD ROUTING - MAIN DAM

SECTION NO. 1 (A&B)



BY D.L.S. DATE 4/30/80 **ROALD HAESTAD, INC.** SHEET NO 11 OF 16

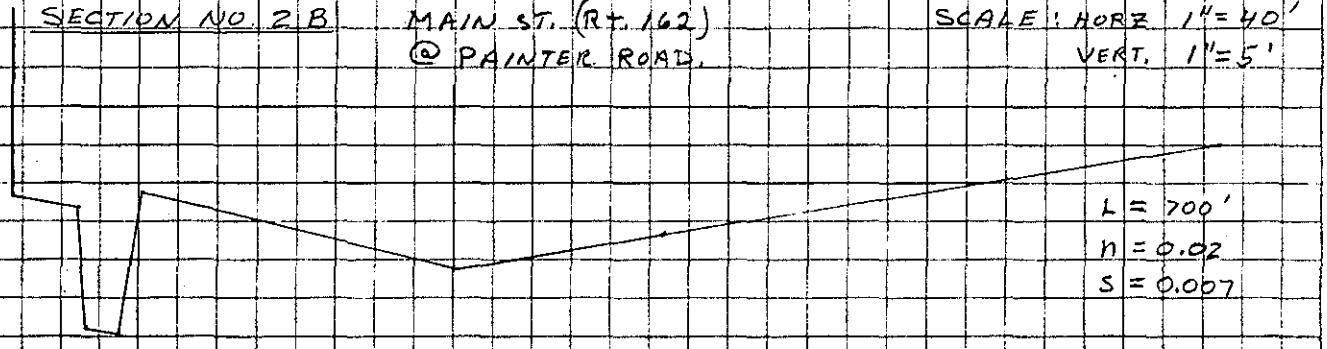
CONSULTING ENGINEERS

CKD BY S.A.L. DATE 5/20/80 37 Brookside Road - Waterbury, Conn. 06708 JOB NO 049-19

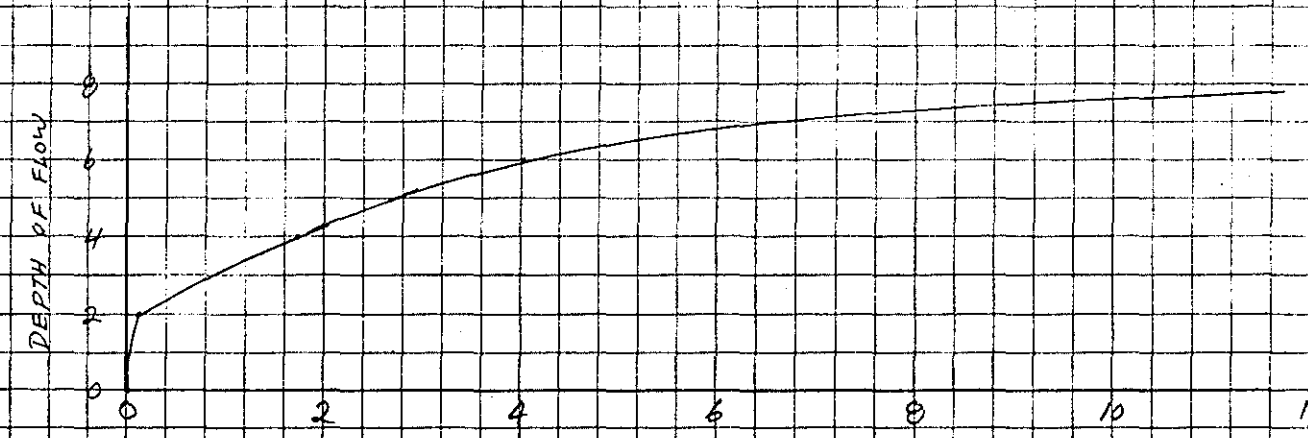
SUBJECT UPPER LAKE PHIPPS DAM - FLOOD ROUTING MAIN DAM

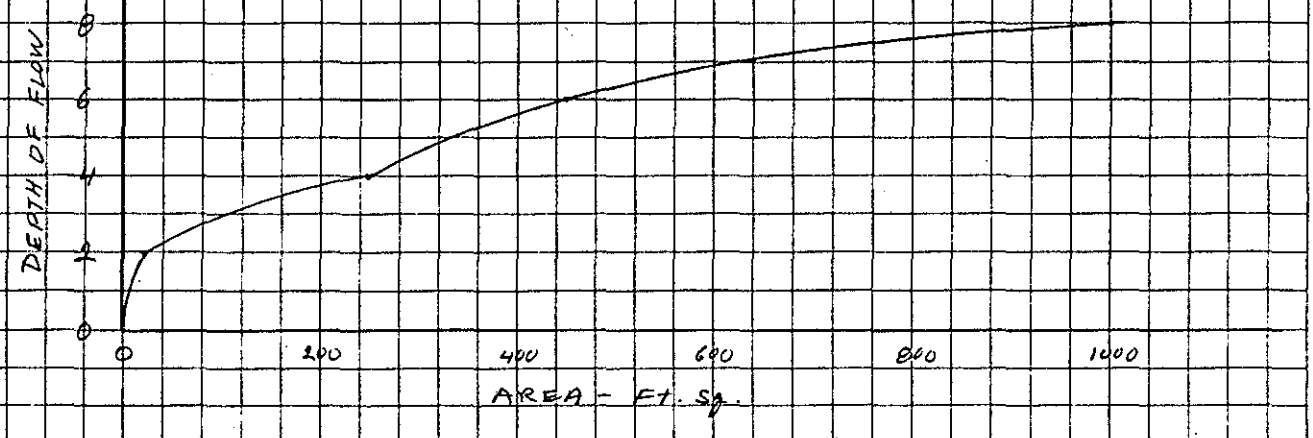
SECTION NO. 2B MAIN ST. (Rt. 162) @ PAINTER ROAD.

SCALE: HORZ 1"=40'
VERT. 1"=5'



D	W_p	A	R	S	V	Q
2	14	20	1.43	0.007	7.89	158
4	208	250	1.20	0.007	7.02	1755
6	260	450	1.73	0.007	8.96	4032
8	300	1000	3.33	0.007	13.86	13,860





SECTION NUMBER 1C

BELOW DAM NO. 2

H	W	A	R	S	V	Q
1.0	46	23	.50	.0100	4.68	108
2.0	78	89	1.14	.0100	8.12	725
3.0	89	172	1.94	.0100	11.56	1993
4.0	100	266	2.67	.0100	14.31	3806
5.0	110	370	3.36	.0100	16.66	6163
6.0	121	484	4.01	.0100	18.74	9080
7.0	132	609	4.63	.0100	20.64	12576
8.0	141	745	5.28	.0100	22.54	16782
9.0	148	886	5.99	.0100	24.51	21714
10.0	157	1035	6.60	.0100	26.13	27037

MANNING COEFFICIENT=N=.0200
STORAGE AT TIME OF FAILURE=S= 320 AC. FT.
LENGHT OF REACH=L= 100 FT.

INFLOW INTO REACH=QP1= 4580 CFS
DEPTH OF FLOW=H1= 4.4 FT.
CROSS SECTIONAL AREA=A1= 302 SQ. FT.
STORAGE IN REACH=V1= .7 AC. FT.

TRIAL REACH OUTFLOW=QP(TRIAL)= 4570 CFS
TRIAL DEPTH OF FLOW=H(TRIAL)= 4.4 FT.
TRIAL CROSS SECTIONAL AREA=A(TRIAL)= 301 SQ. FT.
TRIAL STORAGE IN REACH=V(TRIAL)= .7 AC. FT.

REACH OUTFLOW=QP2= 4570 CFS
DEPTH OF FLOW=H2= 4.4 FT.

BY DLS DATE 4/30/80 **ROALD HAESTAD, INC.** SHEET NO 13 OF 16

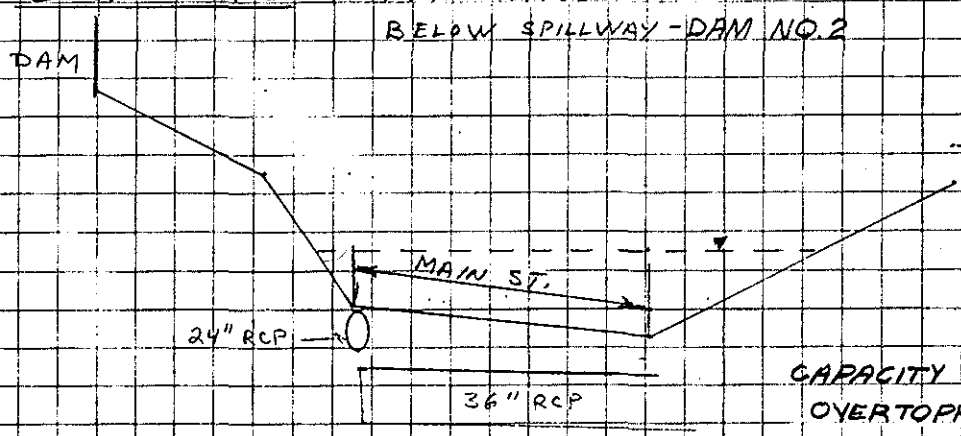
CONSULTING ENGINEERS

CKD BY SAL DATE 7/7/80 37 Brookside Road - Waterbury, Conn. 06708 JOB NO 049-19

SUBJECT UPPER LAKE PHIPPS DAM - FLOOD ROUTING DAM NO. 2

SECTION 1C MAIN STREET BELOW SPILLWAY - DAM NO. 2

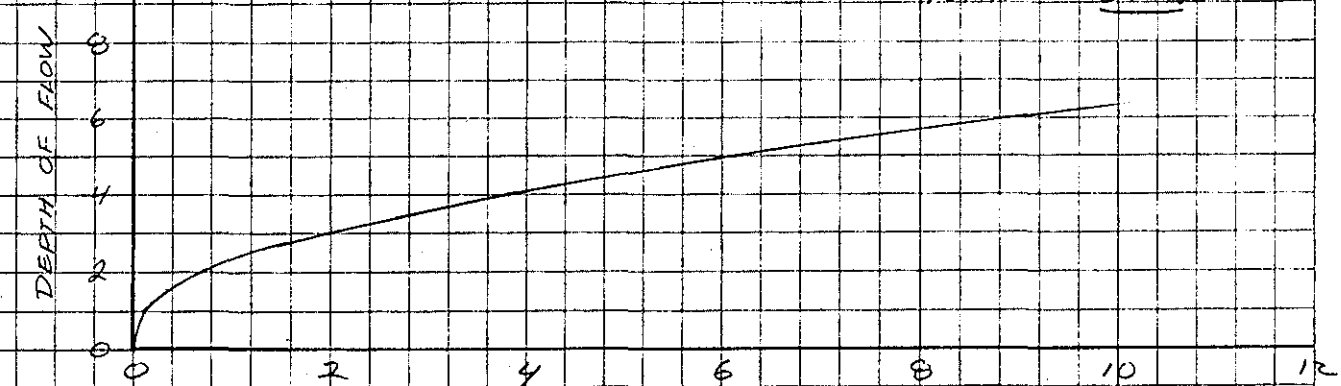
SCALE HORZ - 1"=40'
VERT - 1"=10'

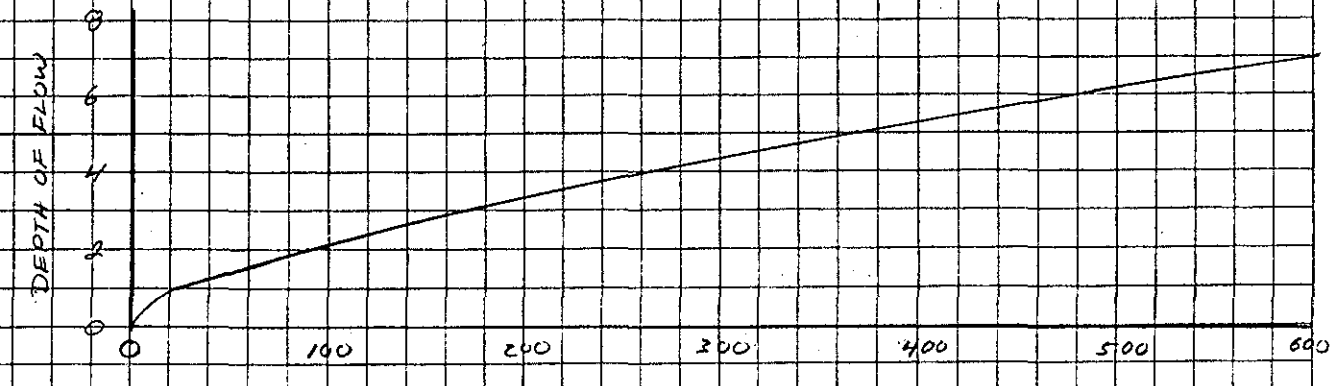


L = 100'
n = 0.02
S = 0.01

CAPACITY OF 24" & 36" BEFORE OVERTOPPING MAIN STREET

24" = 12 cfs
36" = 70 cfs
TOTAL = 82 cfs





SUBJECT UPPER LAKE PHIPPS-FLOOD ROUTING

SECTION NUMBER 2C

ROUTE 162

H	W	A	R	S	V	Q
1.0	54	27	.50	.0170	1.74	47
2.0	107	107	1.00	.0170	2.77	296
3.0	155	240	1.55	.0170	3.71	890
4.0	182	408	2.24	.0170	4.74	1934
5.0	209	602	2.88	.0170	5.60	3371
6.0	236	822	3.48	.0170	6.35	5224
7.0	263	1068	4.06	.0170	7.04	7519
8.0	290	1340	4.62	.0170	7.67	10282
9.0	317	1638	5.16	.0170	8.27	13541
10.0	344	1962	5.70	.0170	8.83	17324

MANNING COEFFICIENT=N= .0700
STORAGE AT TIME OF FAILURE=S= 320 AC. FT.
LENGHT OF REACH=L= 1900 FT.

INFLOW INTO REACH=QP1= 4570 CFS
DEPTH OF FLOW=H1= 5.7 FT.
CROSS SECTIONAL AREA=A1= 747 SQ. FT.
STORAGE IN REACH=V1= 32.6 AC. FT.

TRIAL REACH OUTFLOW=QP(TRIAL)= 4105 CFS
TRIAL DEPTH OF FLOW=H(TRIAL)= 5.4 FT.
TRIAL CROSS SECTIONAL AREA=A(TRIAL)= 692 SQ. FT.
TRIAL STORAGE IN REACH=V(TRIAL)= 30.2 AC. FT.

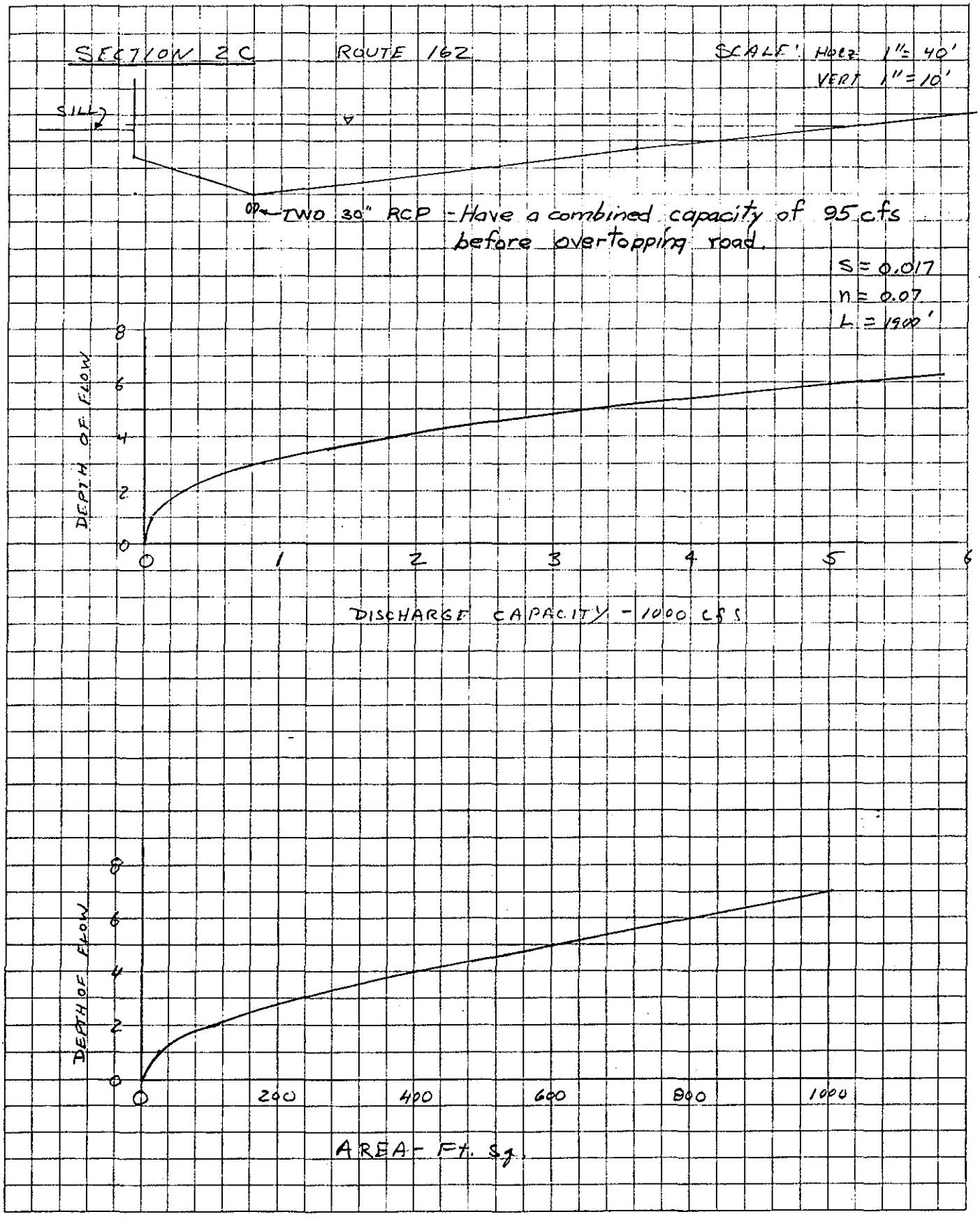
REACH OUTFLOW=QP2= 4122 CFS
DEPTH OF FLOW=H2= 5.4 FT.

BY ... DATE 5/11/80 **ROALD HAESTAD, INC.** SHEET NO 15 OF 16

CONSULTING ENGINEERS

CKD BY SAL DATE 7/7/80 37 Brookside Road - Waterbury, Conn. 06708 JOB NO 049-19

SUBJECT UPPER LAKE PHIPPS DAM — FLOOD ROUTING - DAM AT SPILLWAY

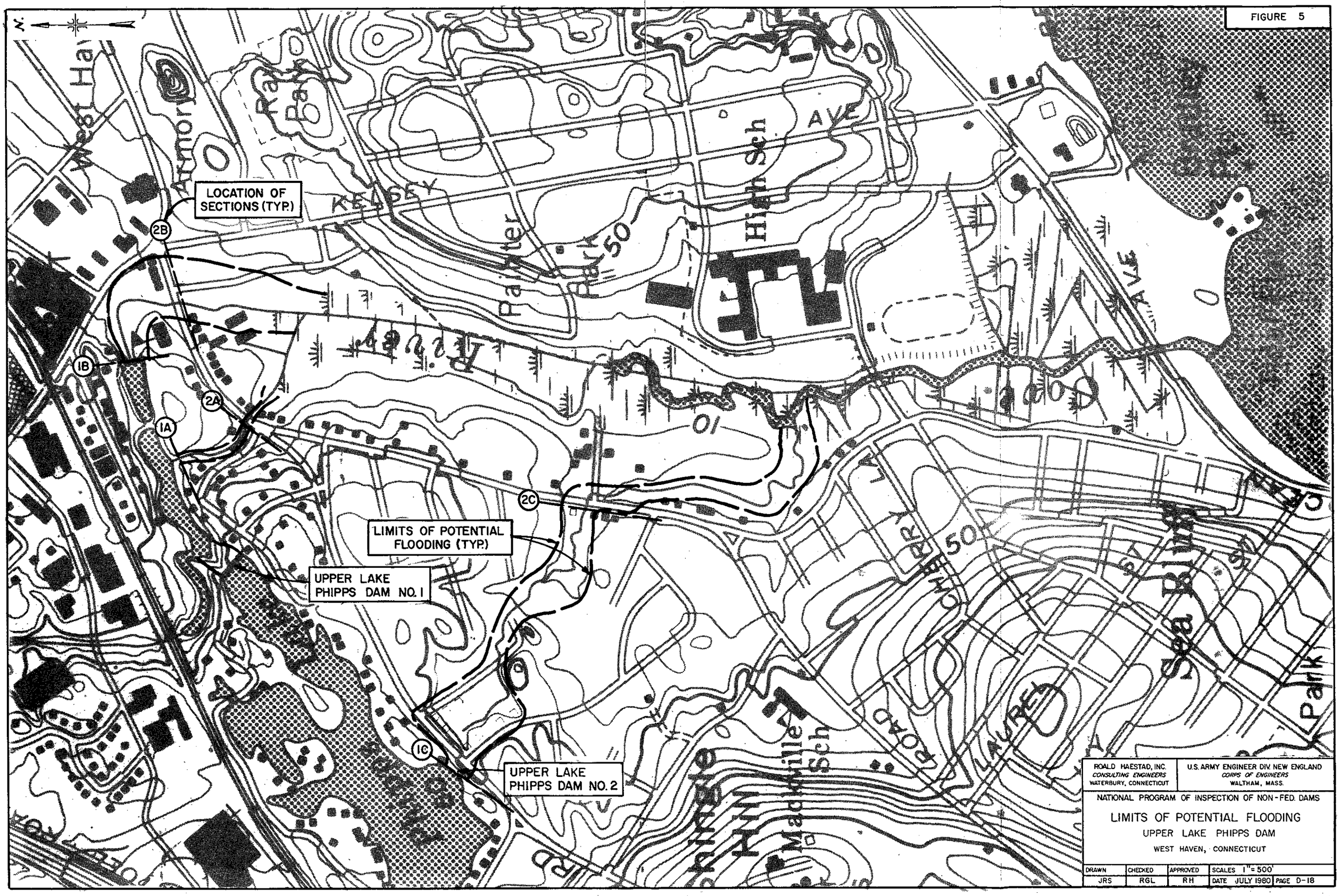


Failure of the dam at the spillway of Upper Lake Phipps would release about 4600 cfs onto and across Main St. Sec. 1C. There is a 24-inch pipe and a 36-inch pipe crossing under Main Street, these have an insignificant capacity compared to the dam breach flood, about 80 cfs. The dam breach flood would overtop Main Street by about 4 1/2 feet and flood several houses to an undetermined depth before returning to the stream channel.

The flood would be about 4,100 cfs at Route 162, Sec. 2C, and would overtop the State Highway by 5.4 feet. Two 30-inch culverts at this point also have a negligible capacity compared to the flood peak, about 95 cfs. The flood waters would inundate 2 houses at Route 162 to about one foot above the sills.

From Route 162 the flood waters would flow within the stream channel and discharge to the tidal marsh without further damage.

FIGURE 5



ROALD HAESTAD, INC.
CONSULTING ENGINEERS
WATERBURY, CONNECTICUT

U.S. ARMY ENGINEER DIV NEW ENGLAND
CORPS OF ENGINEERS
WALTHAM, MASS.

NATIONAL PROGRAM OF INSPECTION OF NON-FED. DAMS

LIMITS OF POTENTIAL FLOODING

UPPER LAKE PHIPPS DAM

WEST HAVEN, CONNECTICUT

DRAWN	CHECKED	APPROVED	SCALES 1"=500'
JRS	RGL	RH	DATE JULY 1980 PAGE D-18

APPENDIX E

INFORMATION AS CONTAINED IN

THE NATIONAL INVENTORY OF DAMS

NOT AVAILABLE AT THIS TIME